

THE MEDIATING ROLE OF SUSTAINABLE
PRODUCT DEVELOPMENT ON THE RELATIONSHIP
BETWEEN QUALITY MANAGEMENT PRACTICES AND
ORGANIZATIONAL PERFORMANCE: A STUDY IN
MALAYSIAN AUTOMOTIVE INDUSTRY

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DEVELOPMENT ON THE RELATIONSHIP BETWEEN QUALITY
MANAGEMENT PRACTICES AND ORGANIZATION
PERFORMANCE: A STUDY IN MALAYSIAN AUTOMOTIVE
INDUSTRY**

By

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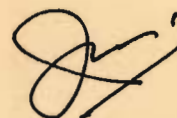
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ABSTRACT

The influences of production enhancements in the world, in ASEAN countries and especially in the Malaysia automotive industry have prompted this study to investigate the relationship between quality management practices and organizational performance. The Malaysian automotive industry has become an important component of the country's economic development. This study also examines the effects of sustainable product development as a mediator and organizational characteristics as moderator of the study relationships. This study is based on 91 automotive component manufacturing suppliers of simple random sampling method was scattered throughout Malaysia. The data obtained in this study were analyzed using techniques such as factor analysis, multiple regressions, the Pearson Product Moment Test and Hierarchical Multiple Regression. Factor analysis was run to decrease items into specifics factors. Multiple Regression analysis was employed to test the relationships between quality management practices and organizational performance. The Pearson Product Moment Test was used to determine which dimensions of quality management practices had strong, positive, significant correlation related to organizational performance. Hierarchical Multiple Regression analysis was employed to investigate the relationship of sustainable product development as mediator, organizational characteristics as moderator in relationship with chosen variables. The study revealed that quality management practices had positive, significant relationships with organizational performance. In addition, Sobel's test showed that the mediating variable of sustainable product development influenced the relationship between quality management practices and organizational performance. This study also revealed that organization characteristics did not act as moderator in the relationship between quality management practices and organizational performance. The study also revealed that various theories such as RBV, Institutional theory and Stakeholder theory can be used to improve the performance of automotive supplier organizations in Malaysia. Meanwhile, this study also found that the implementation of quality management practices could enhancement the organizational performance.

Keywords: Quality management practices, sustainable product development, organization characteristics, organizational performance and Malaysian automotive suppliers

ABSTRAK

Sektor automotif merupakan komponen terpenting dalam pembangunan ekonomi negara. Pengaruh ledakan kemajuan automotif diperingkat dunia pada amnya, khasnya di Asia dan di Malaysia, khususnya telah menimbulkan satu keperluan akan pentingnya satu kajian dijalankan untuk menyelidik hubungan di antara amalan pengurusan kualiti dan prestasi organisasi, pengaruh perantaraan pembangunan produk lestari antara hubungan amalan pengurusan kualiti dengan prestasi organisasi; serta pengaruh penyederhana kriteria organisasi antara hubungan amalan pengurusan kualiti, pembangunan produk lestari dan prestasi organisasi. Kajian in dilakukan terhadap 91 buah organisasi pengeluaran komponen automotif di Malaysia. Pendekatan statistic digunakan untuk menghurai data yang diperolehi dalam kajian ini. Beberapa pendekatan kajian telah diupayakan untuk menganalisis data seperti analisis faktor, analisis regrasi, ujian Pearson, analisis regrasi pelbagai, analisis regrasi pelbagai bertingkat. Analisis faktor dijalankan untuk menentukan beberapa faktor yang terpilih. Analisis regrasi pelbagai digunakan untuk menguji hubungan antara amalan pengurusan kualiti dan prestasi organisasi. Ujian Pearson pula dilakukan untuk meneliti sama ada dimensi dalam amalan pengurusan kualiti mempunyai hubungan secara langsung dengan prestasi organisasi. Analisis regrasi pelbagai peringkat digunakan untuk melihat pengaruh perantaraan pembangunan produk lestari, serta pengaruh penyederhana kriteria organisasi terhadap hubungan amalan pengurusan kualiti dan prestasi organisasi. Hasil kajian menunjukkan bahawa amalan pengurusan kualiti mempunyai hubungan secara langsung dengan prestasi organisasi. Dalam ujian Sobel, terdapat pengaruh perantaraan pembangunan produk lestari antara hubungan amalan pengurusan kualiti dan prestasi organisasi; serta pengaruh penyerderhana sempurna kriteria organisasi terhadap hubungan amalan pengurusan kualiti, pembangunan produk lestari dan prestasi organisasi. Hasil kajian memperlihatkan bahawa gabungan beberapa teori seperti teori RBV, teori institusi dan teori pemegang taruh dapat meningkatkan prestasi syarikat. Faktor sumbangan pengurusan dalam kajian ini ialah amalan pengurusan kualiti dapat meningkatkan lagi prestasi syarikat.

Kata kunci: amalan pengurusan kualiti, pembangunan produk lestari, kriteria organisasi, prestasi organisasi dan automotif Malaysia

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DEDICATION

To my parents:

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LIST OF ABBREVIATIONS

AFTA	ASEAN Free Trade Zone
ASEAN	Association of Southeast Asian Nation
CBU	Completely Built up Units
SO	International Organization for Standardization
ITT	International Telephone and Telegraph
JV	Joint Venture
KMO	Kaiser-Meyer-Olkin
MBNQA	Malcolm Baldrige National Quality Award
OC	Organization Characteristics
OEM	Original Equipment Manufacturing
OP	Organizational Performance
QM	Quality Management
QMP	Quality Management Practices
QMS	Quality Management System
QS	Quality Standard
RBV	Resource Based View
RM	Ringgit Malaysia
SME	Small Medium Enterprises
SPD	Sustainable Product Development
SPSS	Statistical Package for Social Science
TC	Technical Committee
TQM	Total Quality Management
USA	United States of America
WCED	World Commission on Environment

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LIST OF SYMBOLS

β	Beta coefficient
R^2	Coefficient of determination
r	Correlation coefficients
DV	Dependent variable
Y	Dependent variable
SIM	Descriptive data and single item measures
f^2	Effect size of population
X	Independent variable
M	Mean
MSA	Measure of sampling adequacy
K	Number of Independent variables
N	Number of Sample
SD	Standard deviation
n	Sample size
p	Significant level
L	Power value for significant level and degree of freedom
R^2	Proportion of explained variance to effect size values

CHAPTER ONE

INTRODUCTION

1.1 Introduction

In chapter one there have ten main areas will be discussed in details. It begin with introduction, background, research problem statement, research questions and objectives, research scope, study significance, definitions of terms, and thesis organization.

1.2 Background of the Study

These decades, quality management practices and sustainable product development play important roles in advancing firms in the competitive market. Thus, it is believed that quality management is basic practices for organization survival (Nair, 2006), and nowadays, many organizations have embedded quality management practices into their operations. Previous studies by Flynn, Schroeder, & Sakakibara, (1995); Powell, (1995); Lakhal, Pasin, & Limam, (2006); Jirapattarasilp (2011); Kalra and Pant (2013) agreed that QM practices support the organization performance.

As result, many organizations have adopted quality management practices that focused on improving quality, which can substantially improve organizational performance (Yahya & Goh, 2001). Furthermore, quality of product is keys of success in manufacturing industry (Curkovic, Vickery, & Droge, 2000). However, to focus on the quality alone is still insufficient for organizations to survive without considering environmental issues (e.g., sustainable products) (Ishioka & Yasuda, 2009).

The increasing sustainable product development that consists of environmental concerns, growing environmental issues, public pressure and stricter regulations, are fundamentally impacting the way organizations design and launch new products across the globe (Choi, Nies, & Ramani, 2008). Thus, it could be an advantage if the organization could understand well regarding the requirement of sustainable product development, which requires three main pillars: namely as environment, economic, and social aspects (Hemming, Pugh, Williams, & Clackburn, 2004).

In other words, a consideration of quality management practices and sustainable product development made by organizations towards their new product launched could lead to profitable advantages in the competitive market. This is because both these elements are important aspects that require the firms to be exerting conscious and sustained efforts to continuously improve all facets of their business for long term.

1.2.1 Significant Contribution of SMEs in Malaysian Automotive Industry

The Malaysian automotive industry is significantly contributed to economic activities. Furthermore, in the Malaysian economy it provides a livelihood to more than 200,000 people (Ragayah & Shahadan, 2009). We cannot deny that automotive products have contributed to economy and benefit to people transportation, but the processes of automotive products have significance to impact of environment (Nunes & Bennet, 2010).

In fact, in the twenty-first century, the demand toward environment products has been increased and requirement to greener products, environmentally process must relate to beyond organization profit (Nunes & Bennet, 2010). The automotive industry, the environmental impact began from the source of material and could be major impacts after production of the vehicle (Mildenberger & Khare, 2000). It is for this reason the Malaysian automotive industry posed a degree of challenge to the industry itself in the future (Rosli, 2006).

1.3 Problem Statement

This study investigates issues related to quality management practices, sustainable product development, and organizational performance in the automotive industry based on three aspects, namely, theoretical, empirical, and practical. The theoretical aspect covers the explanation of new approaches in creating quality management models and ensuring sustainable product development in the automotive industry. The empirical aspect investigates the contradicting findings in previous studies on this area, while the practical aspect analyze current quality management practices as well as the measurement of the organizational performance of the Malaysian automotive industry. The following section discusses shortcomings and issues related to these areas.

Many studies have investigated the relationship between quality management practices and organizational performance. For example, Garvin (1986) and Curkovic *et al.* (2000) argued that an organization must ensure product quality in

the increasingly competitive and ever expanding global market, because the latter determines the success of a company (Curkovic *et al.*, 2000). Sila (2005) recommended that quality management practices be implemented as a holistic integrated system, rather than an implemented subset of quality management practices. Several empirical studies have shown that quality management effectively improves organizational performance (Flynn *et al.*, 1995; Kaynak, 2003; Powell, 1995; Terziovski & Samson, 1999). Therefore, the research finding contradicts those of Ittner and Larcker (1996), who reported that organizational performance is not important. However, Martinez *et al.* (1998) and Lawler *et al.* (2001) claimed that some cases have positive association. Beaumont *et al.* (1997) concluded that quality management and business performance in either manufacturing or service organizations are not related. Woon (2000) reported that manufacturing and service organizations are not significantly different except for one principle in favor for manufacturing organizations. Furthermore, numerous studies on the Malaysian automotive industry, such as those by Kasolang (2001), Zadry and Yusof (2006), Zakuan *et al.* (2007), Deros *et al.* (2006), Osman *et al.* (2009) and Putri and Yusof, (2009), have yielded unsatisfactory results. This is because the relationship among the quality management practices, sustainable product development, organization characteristics, and organizational performance have not been simultaneously investigated. Current relevant theories and empirical evidence insufficiently address the issues of global sustainability (e.g. sustainable product development), which must be addressed and studied from the perspective of the Malaysian automotive industry.

Quality management practices must be carefully selected because most are partial and not accurate (Powell, 1995). Moreover, implementation management practices increase operational costs for the company. Merino-Diaz (2003) claimed that management practices must be able to distinguish between quality management input and quality management output. Quality management practices have thus been selected based on the frameworks of Flynn *et al.* (1995), Ahire *et al.* (1996) and Merino-Diaz (2003), which emphasize human resources management, product design, process approach, customer focus, leadership, continuous improvement, strategic planning, information analysis, and supplier management, which are primary dimensions that directly improve product quality.

At present, quality management practices seem to have progressed into a third generation of quality management (Foster, 2005). For the new generation of quality management, the objectives are wider than the survival of the organization and include the promotion of global sustainability, which should be properly planned. Isaksson (2004) suggested that quality management practices lack theories and research on extended management structures that support global sustainability; the author also argued that values, methodologies, and tools must be reviewed. This finding is supported by Choi *et al.* (2008) who claimed that organizations must discover new approaches to ensure global sustainability, especially in the automotive industry (Mc Auley, 2003). Foster and Jonker (2007) mentioned that quality management significantly contributes to organizational development and performance, but its lack of theoretical framework has contributed to its marginalization in the last decade. The lack of theories to

support the new approach of quality management practices and organizational performance of the automotive industry has created a gap in the available knowledge.

Researchers increasingly agree that long-term social studies are unsustainable (Meadow *et al.*, 1972; Steffen *et al.*, 2004; Stern, 2006). This transition towards a sustainable society requires companies, governments, institutions, and individuals to make strategic decisions based on their understanding of the requirements and challenges of their respective transitions (Byggeth & Broman, 2001). Product development is among the critical intervention points for the transition of society towards sustainability (Hallstedt, 2008). Roozenburg and Eekels (1995), Charter and Chick (1997), and Ritzen (2000) all argued that the effects of a product throughout its life cycle are largely determined by decisions made during its development stage. The society still generally remains unsustainable despite these suggestions. The actual “greening” of products (Baumann, 2000), time and economic resources (Hansen, 1996), and the lack of incentives (van Hemel & Cramer, 2002) have all slowly progressed. Smith and Sharicz (2011) claimed that an organization should consider not only the profit, but also triple bottom-line perspectives in product development. Organizations can also achieve better business performance by striving to gain competitive advantage. Among the proposed measures is the linkage of quality management practices and sustainable product development (Ishioka & Yasuda, 2009). Despite the large amount of literature on quality management and environmental management (e.g., sustainable product development), research on improving

organizational performance, which combines both, remains scarce (Lagrosen, 2004).

Another important deficiency discussed from the empirical perspective is that previous researchers have not studied environmental management (e.g. sustainable product development) as the mediating variable. Al-Tuwaijri *et al.* (2004), Hart and Ahuja, (1996), King and Lenox, (2002), and Klassen and McLaughlin (1996) reported that environmental management is the independent variable, and the organizational performance is the dependent variable in the positive relationship between the two. However, Molino-Azorin *et al.* (2009) claimed that environmental management (e.g., environmental performance) is an independent variable that is possibly linked to organizational performance. Although extensive research on the influence of sustainable product development on the profitability of organizational performances has been conducted, no single empirical study has yet to adequately examine sustainable product development as a mediating variable. Thus, the existence of issues on sustainable products and how they alter the association between the predictor and the criterion must be examined further (Dale & Plunkett, 1995). Issues on sustainable product development may modify the causal relationship and the sequences between independent and dependent variables (Baron & Kenny, 1986; Howell *et al.*, 1986; Frazier *et al.*, 2004; MacKinnon *et al.*, 2007).

Meanwhile, Molino-Azorin *et al.* (2009) claimed that research on environmental management (e.g., sustainable product) has been mostly theoretical and anecdotal; thus, more quantitative empirical studies must be performed. This statement clearly supports the argument that sustainable product

development serves a mediating role. Thus, there is a need to formulate relevant theories and find empirical evidence to explain the effects of sustainable product development on organizational performance, especially in the Malaysian automotive industry. A study must fill this void in the theoretical and empirical levels.

This study also assesses whether organizational characteristic criteria, such as firm size, type of ownership and length of quality management adoption, moderate the relationship between quality management practices and organizational performance. Previous studies have suggested that the length of quality management adoption and its performance are positively related (Powell, 1995; Terziowski & Samson, 1999; Dow *et al.*, 1990; Arawati & Za'faran, 2000). However, Arawati (2008) claimed that the length of quality management adoption in the Malaysian electronics industry is not related to the electrical industry. Ramasany *et al.* (2005) stated that firm size is negatively correlated, and ownership type in Malaysian palm oil is positively correlated to the length of quality management adoption. Empirical evidence for objectively investigating firm size, ownership type, and the length of quality management adoption in the Malaysian automotive industry is currently lacking.

For the reasons stated above, this research attempts to fill the gap from the theoretical, empirical, and practical aspects of quality management practices, sustainable product development and organizational performance, with the aim of providing solutions to the identified issues, especially because the highlighted gap has not attracted much research attention. This research also attempts to study the extent of the relationship between quality management practices and

sustainable product development, which directly affects organizational performance.

1.4 Research Questions

Purpose of this study is to investigate the relationship among QMP (quality management practices), SPD (sustainable product development), OC (organization characteristics) and OP (organizational performance) are based on research background and as highlighted in research problem. In general, this research is guided by four major research questions:

1. Are there any relationship between QMP and OP of Malaysia automotive industry?
2. To what extent do dimensions of QMP effect on OP?
3. What is mediating effect SPD between QMP and OP?
4. What is the moderating effect of OC between QMP and OP?

1.5 Research Objectives

To answer the research questions, the following four main research objectives have been developed:

1. To determine the relationship of QMP and OP.
2. To determine effect of QMP on OP.
3. To examine the mediating effect of SPD in between QMP on organizational performance.
4. To examine moderating effect of organization characteristics of QMP on OP.

1.6 Research Scope

This research is based on Malaysia automotive industry (inclusive of SMEs), where automotive manufacturing companies offer semi-finished parts or products to primary organizations, which include 275 vendors in Malaysia, where these organizations have applied the core elements of quality management practices and sustainable product development. Thus, the sample is limited to Malaysia automotive vendors. In this study, the researcher is interested in analyzing the mediating influence of sustainable product development in between quality management practices and organizational performance.

Malaysian automotive industries are selected as firms to be studied for this research because of two reasons. Firstly, the Malaysian automotive needs a new approach of quality management, to validated theoretical framework as related to their daily operation as for sustain in their business operation since received tight competition from ASEAN country, especially from Thailand, Indonesia and Vietnam. Secondly, an automotive industry is a main contribution of Malaysian economic growth, while as one of backbone of achievement towards vision 2020 compare to other industry.

1.7 Significance of the Study

From the literature, quality management practices and sustainable product development have been examined and become significant for this study. The study has proposed nine dimensions of quality management practices that were adopted from Flynn *et al.* (1995), Merino-Diaz (2003).

The both quality management practices and sustainable product development have great influence on organizational performance and to measure the strength of the influential relationship of sustainable product development on organizational performance, as reason this research to fill the gaps of theoretical framework of linkage quality management practices, sustainable product development, organization characteristics and organizational performance. However, there is very little empirical evidence, in previous studies and the results presented were not practical enough to generalize in automotive industry.

This research will present the theoretical framework and empirical evidence of study variables in relationship QMP and OP. Mediating effect of sustainable product development and moderating effect of organization characteristics. The quantitative method was used to find out all these relationship in this study. It is believed that the result finding from this study will contribute academia research knowledge and automotive industry player for better sustainable products and quality and help the firms for survival in business operation.

1.7.1 Contributions of Theory

First contribution of theory is focusing QMP and OP. This study will investigate the each dimension in QM practices have influence on organizational performance. Second contribution of theory is examining the mediating effects of sustainable product development. Thus, this study also provides systematic explanation for the moderating effects of organization characteristics. Third contribution of theory in this study is introduce new theoretical framework suggestion which included third generation of quality

management by addressing the theory and empirical evidence for local firms and global. Fourth contribution of theory, the suggestion of new dimension in QM practices and together with variables of sustainable product development and then contribute the knowledge for researcher in academia and industrial area.

1.7.2 Contributions of Managerial

Firstly, the empirical evidence of new dimension in QMP that have impact on OP in automotive industry. It will help industry sector to achieve higher level of quality products. Furthermore, this study will identify which of the nine variables of quality management practices can lead to strong organizational performance specifically within in chosen industry. Consequently, public pressure, regulations and global requirement towards environmental issues have change the landscape of chosen industry to be proactive in sustainable product development (namely: economic, environment, and social) in their new develop or current product will emphasizes the better organizational performance.

Identifying the effective quality management practices, sustainable product development in chosen industry, practitioners must consider numerous factors (e.g. organization characteristics that consists of size of firms, ownership of firms, and length of time quality management practices adoption) also contributed to organizational performance.

Secondly, from an academic standpoint, this research contributes to the study of third generation of quality management practices, which has received considerably less attention before.

Thirdly, based from empirical evidence of these study will benefit many sector such as industry and related government agencies as for their guideline to design new policy to help local vendors to achieve better quality of products and sustainability in business. The finding result of this study will be presented in automotive vendor conference as to share the knowledge and research valuable finding result. On other hand, researchers in academia also receive the benefit of this finding result, especially those who involve directly in automotive industry that study related to QM practices, sustainable product development in SMEs sector.

1.8 Definitions of Terms

This parts are briefly explained the terms used in this research. These definitions are important of this research because it provide standardize the meaning throughout the research.

(a) Quality Management Practices (QMP)

Quality management practices are defined as a management approach to make a quality of products based on all members participation with focus long term business success, customer satisfaction throughout benefit to organization and society. (Wiklund, Wiklund, & Edvardsson, 2003).

(b) Sustainable Product Development (SPD)

Sustainable product development is defined as those products that provide economical, environmental, and societal benefits while protecting public health and environment over their whole life cycle, from the extraction of raw materials until the final disposal (Hemming *et al.*, 2004).

(c) Organizational Performance (OP)

Organizational performance is defined as a performance output produce by firm against their desired output. The performance measurement framework to reconcile the use of financial and non-financial measures (Kaplan & Norton, 1992; Lingle & Schiemann, 1996; Schiff & Hoffman, 1996; Lipe & Salterio, 2000).

(d) Organization Characteristics (OC)

Organization characteristics are defined as a certain characteristics of organization in term of internal and external factors which effect the organizational performance. This involved strategies, structure, and activities (Ferreira & Teixeira, 2012; White & Bruton, 2007; Lederman, Olarreaga, & Payton, 2010). Organization characteristics used in this study are; size of firms, ownership of firms, and length of time quality management adoption.

1.9 Organization of the Thesis

In this study, the organization of the thesis divided into six chapters. The following are description of the content of each chapter. Chapter one is

introduction of this study that consists of introduction, research background related to this study, statement of problem, research questions and objectives, significance of study, scope and limitation of study, definitions of terms use, organization of thesis.

Chapter two is literature review of study, in the first section it explains the relevant studies of quality management practices and their dimension used in this research. Second section explains the sustainable product development as mediators and follows by organization characteristics as moderator. Finally, this section explains organizational performance.

Chapter three explains the theoretical framework and development of hypotheses from extensive review the literatures, research design, the population, and instrument used. In chapter four, it explained the research methodology in order to get the solution of research questions. It begins to explain the related theory of study, theoretical framework, research hypotheses and summary.

Chapter five will elaborate on the findings of the study. It starts by undertaking descriptive statistics on the respondents and organization demographic, goodness of measure, test for nonresponse bias, skewness and kurtosis, factor analysis, reliability test, descriptive mean analysis, normality, linearity, multivariate outlier, multicollinearity, Pearson test, multiple regression analysis, and hierarchical regressions results.

In chapter six, it concern about discussion and conclusion of study. It starts by discussion of findings, contribution of this study in both theoretical and empirical, as well as the limitation of study and recommendations for future research. This thesis will enclose the references of questionnaire, and the SPSS output as appendices.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter describes a detailed review of previous related literature. The review is carried out to identify important concepts, variables, critical success factors, and significant findings, and to facilitate the construction of the framework to be used in this study. Firstly, literatures that are relevant to quality management practices (QMP) and its dimensions are reviewed. Also, the concept of sustainable product development (SPD), organization characteristics (OC), and organizational performance (OP) is carried out for justification of the study.

The comprehensive literature base has given broad establishment of the relationship between developed constructs. Since, there has not been much research done in development of dimension in new age of automotive industry, especially between the construct of quality management practices, sustainable product development, organization characteristics, and organizational performance. The study hopes to extricate the relationship of QM practices and organizational performance that mediated effect by sustainable product development and moderating influence of the organizational characteristics.

2.2 Research Theoretical Background

This research theoretical background is integrated with three types of theory namely: resource based view theory, institutional theory, and stakeholder theory. Following statement will be describing on the related theories use in this research.

2.2.1 Resources Based View Theory

According to authors such as (Schumpeter, 1934; Penrose, 1959; Wernerfelt, 1984; Barney, 1991; Nelson, 1991; Prahalad & Hamel, 1990; Teece, Pisano, & Shuen, 1997) claimed that resource-based view of the firm is an influential theoretical framework for understanding how competitive advantage within firms is achieved and how that advantage might be sustained over time. In particular, resource-based view assumes that firms can be conceptualised as bundles of resources that those resources are heterogeneously distributed across firms, and that resource differences persist over time (Amit & Schoemaker, 1993; Penrose, 1959; Wernerfelt, 1984).

2.2.2 Institutional Theory

Institutional theory emphasizes the role of social and cultural pressures imposed on organizations that influence organizational practices and structures (Scott, 1992). This theory is implied by Jennings and Zandbergen (1995), who were amongst the first to apply institutional theory to explain the organizations' adoption of environmental management practices.

According to Hoffman and Ventresca (2002), the institutional sociology framework emphasizes the importance of regulatory, normative, and cognitive factors that effect firms' decisions to adopt a specific organizational practice, above and beyond the practices of technical efficiency. However, firms can adopt various types of environmental management practices in response to institutional pressures. As a result of this, Sharma (2000) further explained that there were two conditions to a firm's response to institutional pressures, firstly, there are environmental strategies of conformance that focus on complying with regulations and adopting standard industry practices, secondly, there are voluntary environmental strategies that seek to reduce the environmental impacts of operations beyond regulatory requirements.

2.2.3 Stakeholder Theory

The term of "stakeholder" was used by Freeman (1984) during he wrote the first internal memorandum at the Stanford Research Institute. He claimed that stakeholder can be defined as groups have a capable to cease the organization out in business. Furthermore, Foley (2005) argued that the stakeholders can be defined those entities that are interested in organization business, could effect the organization performance if their requirement are not fulfilled. Moreover, Schilling (2000) stressed that the organization could be failed in business if they not recognized the stakeholder relationship in their business strategies. As reason, Foley (2005) identified that the managing and engagement the stakeholder are more important agenda in nowadays business.

Since 1990s, the scope of stakeholder have been debated whether it should be included with social and ecological needs (Waddock & McIntosh, 2009). Consequently, the definition of stakeholder should go far beyond of the relationship with customer. It should be included with employees, suppliers, partners, market analysts and investors (Galbreath, 2002; Donaldson, 1998). However, Susniene and Vanagas, 2005 claimed that the multidimensional relationship should be involved with supplier, customer, investors, employees, government, political groups, business association and community. It was support by Barney (2001) agreed that by truly independent relationship, trust each other in multidimensional relationship that will create win-win opportunity for business environment.

In this study, stakeholder theory is view on how the quality management practices can be integrated with internal and external relationship. This relationship should be emphasized in organization strategies, as far as to encourage the multidimensional relationship among stakeholder and beneficial to the organization (Susniene & Vanagas, 2005).

2.3 Quality Management Practices

Juran (1988) states that the origin of handicraft industries and their quality control in China's history can be traced back to the 16th century. However, Steffens and Bradley (2006) have credited Ibn al-Haytham (965-1040) as being first scientist who contributed to quality studies. This is supported by Morgan and Hamilton (2007), who described the significance and contributions of Ibn al-Haytham in the

field of science management. Furthermore, there were contributions of quality management practices from quality gurus such as Deming (1986) who has a statistical background, and declared that the manufacturing process can be measured, and when process variations occurred, they can be traced back to their root causes. He also emphasized that those fourteen points that were introduced could be used as guidelines to help management transform their businesses. However, Juran (1986) believed that quality must be planned, and he further added that the improvement of quality must begin from the top management.

Meanwhile, the concept of quality management practices had been implemented a long time ago; it has been used prominently since the 1950s as an instrument for managing change, and according to Rampersad (2005), quality management began in Japan following visits by three key American quality gurus. The ideas propagated by these quality gurus can be divided into four periods, as mentioned by Mann and Kehoe (1994). The first period is when the Americans took the messages of quality to the Japanese in the early 1950's. The second period is the Japanese responded from the late 1950's onwards. The third period is the new Western wave concentrated on quality awareness from the 1970's onwards, and the fourth period is Motorola's strategy in the 1980's, of increasing profitability by reducing defects, based on the Six Sigma methodology.

Feigenbaum (1983) is the originator of total quality control, and argues that quality needs to be applied to all stages of a process. On the other hand, Ishikawa (1985) has paid particular attention to technical statistical techniques used in the industry. Moreover, Taguchi and Wu (1979) have paid particular attention to quality

in the design stage. They focused on the methodology of testing products prior to the manufacturing process.

This study framework established reflects the idea expressed by Ahire and Golhar (1996). Their opinion is that commitments on the part of management can be seen by implementing a set of strategies that take into account three important stakeholders in the operation of the organization: customer, supplier, and employees. Therefore, this study will use the quality management practices of critical success factors as developed by Merino-Diaz (2003), which were identified five quality management practices are core in manufacturing industry are namely, design of products, human resources management, process approach, supplier management, and customer focus.

Unfortunately, there is no fixed definition of quality. But, there are numerous definitions of quality; but interestingly, no sole definition can explain the whole picture of quality (Eriksson & Hansson, 2003). Reeves and Bednar (1994, p.419) have pointed out that: “Regardless of the time period or context in which quality is examined, the concept has had multiple and often muddled definitions and has been used to describe a wide variety of phenomena”.

On the other hand, quality management has been defined as a philosophy or an approach to management, and made up of a set of mutually reinforcing principles, each of which is supported by a set of practices and techniques (Dean & Bowen, 1994). In addition, Tari and Sabater (2006) declared that the theory of quality management has been developed from three areas; contributions from quality leaders (Deming, 1982; Ishikawa, 1985; Juran, 1988), formal evaluation models (e.g., European Quality Award) and measurement studies (Flynn *et al.*, 1994; Saraph *et al.*,

1989). As a result, quality management practice definitions have been influenced by the contributions from quality leaders.

Based on previous studies in automotive industries, such as Ahire and O'Shaughnessy (1998) have identified that quality management practices construct consists of customer focus, supplier quality management, employee empowerment have influence the organizational performance in US and Canada countries. Kasolang (2001) claimed that leadership, strategic planning, customer focus, market focus, information and analysis, human resources management, process management and business result have positive relationship with organizational performance in Malaysia automotive industry.

Isac (2010) claimed that the construct of quality management practices are such as customer focus, continuous improvement, employee empowerment, use of quality tools, product design and supplier management have impact of organizational performance in Romania automotive industry. Park, Kim, and Chan (2006) emphasized that quality management practices element of process management, human resources, top management strategies are important factors in Korean automotive industry. Meanwhile, Zadry and Yusof (2006) stressed that quality management construct are namely measurement feedback, leadership, work environment and culture, system and process, supplier management, continuous improvement, education and training, and resources management are critical agenda in Malaysia automotive industry.

Similarly, Zakuan *et al.* (2007) studied that quality management practices of construct are namely quality leadership, customer focus, quality information, human

resources management, strategic planning, supplier management, quality result, and quality assurance are important elements in Malaysia automotive industry. However, Deros *et al.* (2006) have found that quality management practices that consist of top management, training, decision on fact, teamwork, internal and external customer focus are required in Malaysia automotive industry. Jirapattarasilp (2011) studied in Thailand automotive industry have revealed that quality management practices of construct are known as quality management policy, quality management method, top management involvement, quality activities, usage of quality tools, human resources management, team working, data collection, quality process, cost control, and product development are element need to absorbed by automotive industry.

Generally, from the definitions for core elements of TQM from previous studies, and on the basis of a thorough review of the literature (Crosby, 1979; Deming, 1986; Juran, 1988, Sila & Ebrahimpour, 2002, Flynn *et al.*, 1995), the researchers had identified nine initial core elements of quality management practices. Table 2.1 summarized the core elements as dimensions of quality management practices used in this study. There are leadership, human resources, supplier management, customer focus, process approach, product design, strategy planning, information analysis, and continuous improvement.

Table 2.1

The Core Elements of Quality Management Practices

Core Elements	Authors (Year)
Leadership	Saraph <i>et al.</i> (1989); Ahire <i>et al.</i> (1996); Brah <i>et al.</i> (2000); Sila and Ebrahimpour (2002); Lakhal <i>et al.</i> (2006); Fotopoulos and Psomas (2009); Kasolang (2001); Zakuan <i>et al.</i> (2007); Arumugam <i>et al.</i> (2011); Kalra and Pant (2013); Ramesh (2012); Talib and Rahman (2010).
Human Resources	Tari <i>et al.</i> (2006); Sila, (2005); Ou <i>et al.</i> (2007); Brah and Lim, (2006); Karuppusami and Gandhinathan, (2006); Ramesh (2012); Jirapattarasilp (2011)
Supplier Management	Sila (2007); Zadry and Yusoff, (2006); Demirbag <i>et al.</i> (2006); Kaynak, (2003); Arawati, (2005); Tari <i>et al.</i> (2006); Karuppusami and Gandhinathan, (2006); Kalra and Pant (2013); Punnakitakashem <i>et al.</i> (2010)
Customer Focus	Deming (1986); Juran, (1988); MBNQA, (1987); Rampersad, (2001); Zairi, (2000); Kanji and Wallace, (2000); Terziovski and Samson, (1999); Lagrosen, (2000); Taylor and Wright, (2003); Flynn <i>et al.</i> (1995); Venkatraman, (2007); Kalra and Pant (2013)
Process focus	Juran, (1989); MBNQA, (1987); Terviovski and Samson, (1999); Harrington, (1995); Sallis, (1996); Bergman and Klefsjo, (2003); Venkatraman, (2007); Kalra and Pant (2013); Ramesh (2012)
Design of Product	Li <i>et al.</i> , (2003); Kaynak, (2003); Arawati, (2005); Salaheldin, (2009); Kalra and Pant (2013)
Strategy Planning	Mintzberg (1994); Quinn (2000); Evans and Lindsay (2005); Punnakitakashem <i>et al.</i> (2010)
Information Analysis	Molander (1993); De Ron (1998); Oakland (2000); Sarkis (2001); Wiele and Brown (2002); Bergman and Klesfjo (2003); Punnakitakashem <i>et al.</i> (2010)
Continuous Improvement	Marin-Garcia <i>et al.</i> (2008); Imai (1986); Caffyn (1999); Dooley and Johnson (2001); Bessant <i>et al.</i> (1994); Dale and Plunkett (1995); Osman <i>et al.</i> (2009)

In this study, the researcher have emphasized that there are necessity to find out the critical elements in nowadays automotive business. Thus, automotive industry has faced critical decisions in term of quality of products and globalization

of industries. This study proposed the constructs of quality management practices are namely: leadership, human resources management, supplier management, customer focus, process approach, design of product, strategy planning, information analysis, and continuous improvement.

2.3.1 Leadership

The implementation of quality management practices in the plant is needed initiative from leadership of the organization. As suggested by Dale and Plunkett (1995), Juran (1988) leadership role has been identified as one of the major factors of successful TQM implementation. Ahire *et al.* (1996) claimed that leadership acts as pillar driver for TQM implementation, creating value, goals and systems to satisfy customer expectations and to improve an organization's performance. According to Shetty (1987) leadership have to lead and support in tandem with company's develop vision and consistent to reflect its commitment company goals, policies, priorities and executive behavior.

Despite the countless article and journals written about leadership responsibility in the organization it is cannot be denied that leadership has significant influence of organizational performance (Everett, 2002; Buch and Rivers, 2002). Meanwhile, Rao *et al.* (1996) stated that leadership is senior management's that personally involve and acceptance of responsibility, visibility and shared vision and goals. For example, leadership role contributed to organizational performance. It's shown that leadership has

significant contribution for organizational sustainability in business (Preston *et al.*, 1995).

Previous study about top management or leaderships role in organization have been done by Deming, Feigenbaum, Crosby and others authors were consistently emphasized that need top management. It was supported by Everett (2002) stressed that top management or leadership need to initiate, to lead and to engage in quality activities is very significant values could influence the development of TQM in the organization. An example, Quality gurus also emphasized the important of leadership in organization such as Deming's 14 point where highlighted that top management is not only for supervision but also to providing guidance to help employees to do better jobs with less effort and help to eliminate the element of fear from the job and encourage teamwork (Deming, 1986). Feigenbaum (1983) claimed that the quality of leadership must have continuous management planning and constant focus and lead quality effort. In sum, leadership is essential requirement of quality management practices (Leiter & Maslach, 2002). Argument of leadership on quality management practices has been discussed by Das *et al.* (2011) mentioned that for implementing total quality management principles are required leadership competencies those involved the knowledge, skills, abilities, and attributes.

In point of view of leadership development, there are some arguments among authors on the concept of leadership characteristics towards organizational style such as traditional leadership research (Kets de Vries *et al.*, 2004, p. 477).

Many organizations view leadership as a major source of competitive advantage, as growing in number of research journals which positions leadership as having a central role and responsibility in constituting organization leadership success (Bass and Steidlmeier, 1999); (Hesselbein, 2004).

The leadership in twenty first century organizations found that they should not only move from hierarchically structured organizations to learning organizations, but also they must take the next step from learning organizations to teaching organization (Evan & Lindsay, 2005). Consequently, Vogl (2003) claimed that another important aspect of the leadership is embracing global environmental aspects such as (1) regulatory pressures, (2) changing demographics, (3) pressure from nongovernment organizations, and (4) greater transparency. Leadership in twenty first century organizations need more emphasized its responsibility to social public health, safety and environmental (Vogl, 2003). Furthermore, some of the empirical studies also highlighted leadership as critical factor of organizational performance (Lau & Idris, 2001).

2.3.2 Human Resources Management

The human skill is difficult to copy by other organization. It naturally designed for activities and coordinate among them for the activities in the organization (Byars & Rue, 1991). In fact, executives ranked methods related to human resource management as most effective in improving quality (Bowen & Lawler, 1992). Deming's 14 points include several human

resources related directives; to institute training on the job, to break down the barriers between departments to build teamwork, to drive fear out of the workplace, to eliminate quotas, to create conditions that allow employees to have pride of workmanship, and to institute programs of self-improvement and education.

Human resources particularly have yielded enormous advantage to an organization because it is the only resource competitors cannot copy (Evans & Lindsay, 1996; Brown & Eisenhardt, 1995). It is now generally recognized that because people are the most variable of all the factors, and the least easy to understand and control of all management resources, effective utilization of their potential can provide a company with a unique ability to adapt to an ever-changing environment.

Rao *et al.* (1996) found that human and financial resources must be organized in an optimal way to address the project's objective. For most companies, this has meant a significant shift from a predominantly functional or vertically-organized approach to a team-based, horizontal approach. As a consequence, the relationship between HRM and organizational performance has been the topic of a heated debate over the last decade (e.g., Wright & Snell, 1991). Effective teams bring in all the relevant players early in the process and maintain continuity of personnel throughout (Rao *et al.*, 1996).

Miner and Crane (1995) reported a high correlation between strategic human resources and success of a company. Their study have revealed the following:

- Human resources management can be a powerful tool to enhance competitiveness when policies and practices are logically driven by a firm's strategy and by key environmental factors that it faces.
- The companies studied carried out their staffing and training and development functions in a way that supported each organization's major business strategy.
- The competitiveness of the firm was enhanced by the way the formal human resource policies were implemented (Kydd & Oppenheim, 1990).

Mandal *et al.* (1998) opined that high quality management practices not only placed companies on a higher competitive plane than their counterparts, but also made a wider range of strategic options available. Companies began to assess their human resources and technical systems in terms of their contribution to obtaining a competitive advantage. The American Quality Foundation & Ernst and Young (1991) which focused on the quality management practices of 500 companies on three continents found that employee involvement was one of the ten practices that had a significant impact on overall business strategy.

Leonard and Sasser (1982) found that a lever for quality management was in the management's ability to encourage open participation by employees in quality improvement, emphasize on employee training and development, and hire managers with high levels of personal concern for

quality. A study by Saraph *et al.* (1989) found that employee involvement, and specifically employee training, were two of eight critical factors for effective quality management.

2.3.3 Supplier Management

Supplier management has been defined as organizing the optimal flow of high-quality value for money, materials, or components to manufacturing companies from a suitable set of innovative suppliers (Goffin *et al.*, 1997). Suppliers play a vital role in helping manufacturers to achieve high performance and this has become widely recognized over the past few years (Monczka *et al.*, 1998). This is because effective supplier management reduces costs (Asmus & Griffin, 1993; Christopher, 1997; Davis, 1993) and leads to higher quality (Burt, 1989; Larson, 1994). Other benefits include better delivery performance (Christopher, 1998) and competitive advantage (Monczka *et al.*, 1993).

Once suppliers have been selected, relationships need to be developed. Lamming (1993) had recognized the competitive advantages resulting from close buyer-supplier relationships. Krause and Ellram (1997) showed that manufacturers could raise suppliers' performance by setting challenging goals, and actively assisting them to achieve these goals. In other studies, Hartley & Jones (1997) identified two different approaches to supplier development. They found that a process-oriented approach was more effective than a results-oriented approach. For example, effective supplier management can take costs out of the supply chain (Christopher, 1997).

In the automotive industry, a typical passenger car contains more than 30,000 parts (Takeshi & Fujimoto, 2001). This means that the competitiveness of an automotive producer is highly dependent on the capability of its suppliers. Many studies in the past have shown that Japanese firms have had particularly efficient and effective supplier systems, and that these supplier networks have played a major role in the international competitiveness of the Japanese automobile industry (Abernathy *et al.*, 1983; Cole & Yakushiji, 1984; Cusumano, 1985; Womack *et al.*, 1990; Cusumano & Takeishi, 1991; Nishiguchi, 1994; Helper & Sako, 1995).

Many automotive industries studies showed that effective supply chain management, which has often been observed in Japan, involved close, trusting relationships with long-standing suppliers who were typically intimately involved with development as well as production of components (Asanuma, 1989; Womack *et al.*, 1990; Nishiguchi, 1994; Dyer, 1996; Helper, 1996). However, in the automotive industry, outsourcing has recently become an important strategy for many firms, partly due to an increased pressure towards down-sizing and a growing recognition of possible advantages of cooperative inter-firm relations (Miles & Snow, 1984; Jarillo, 1988; Johnson & Lawrence, 1998; Kanter, 1989; Dertouzos *et al.*, 1989).

According to Spenley (1992), it is almost impossible to find a company or business that does not depend on this type of supplier. This means that every supplier to the company must adopt the same TQM principles and quality culture.

2.3.4 Customer Focus

Generally, customers define quality and employees strive to produce it. This would require the producers or service providers to clearly identify the customer needs prior to product development (Crosby, 1979; Deming, 1982; Juran, 1988). Besides, organizations have viewed customers as people who buy and use their products (Ahmad *et al.*, 2008).

Sila and Ebrahimpour (2002) conducted a comprehensive review of TQM literature and reported that customer focus and satisfaction received the widest coverage in a survey of the TQM literature. This result is supported by Sousa (2003), who stated that the importance of customer focus lays in the fact that it is the starting point of any quality initiative. Needless to say, customer focus is as important as many other quality management practices to organizational performance (Dean & Bowen, 1994).

Customer relationship practices could also enhance a company's production performance by enhancing product design efficiency (Reed *et al.*, 1996). And at the same time, quality problems could be reduced by including customer requirements in the new product and service design stage (Kaynak, 2003). As such, the improved product design could allow companies to enhance their product quality, reduce costs of defective production, and improve productivity (Reed *et al.*, 1996).

However, Ahire *et al.* (1996) stressed that, despite the use of the latest process improvement techniques and capable management, a firm's neglect of its customers may lead to disaster. In fact, the pressure to revitalize manufacturing over the last decade has been rooted in customers' demand for

a greater variety of reliable products with shorter lead times (Ahire *et al.*, 1996). In fact, the importance of customer focus is also evidenced from the fact that it is assigned the highest weight among the criteria for the Malcolm Baldrige Award.

Also, Ahire *et al.* (1996) found that the organizations may outperform their competition by being able to; (1) respond quickly to customer's demand with new ideas and technologies, (2) produce products that satisfy or exceed customers' expectations, and (3) anticipate and respond to customer's evolving needs and wants. Therefore, customer focus must be reflected in the overall planning and execution of quality efforts. Customer focus of an organization is usually assessed by the frequency and rigor of customer satisfaction surveys. However, mere execution of such surveys is not useful unless the results are made available to functional areas such as manufacturing, and design and planning (Ahire *et al.*, 1996).

In this study, researchers concluded that customer focus is the main factor of success to quality management practices in the organization. Similarly, customer satisfaction is concerned with such achievements as customer retention and market penetration (Rao *et al.*, 1996; Allred, 2001; Zairi, 1994). This requires listening to customers and trying to satisfy their needs (Eklof & Selivanova, 2000; Winser & Corney, 2001). In addition, the expectation of the customer on the research outcome must be clearly communicated and understood (Projogo & Sohal, 2006; Terziovski & Samson, 1999).

2.3.5 Process Approach

The purpose of the process approach is to make a quality of products and delivery to customer for their use (Johansson, 2008). Meanwhile, Bergman and Klefsjo (2003) claimed that the process approach is a flow of activities and the main objective of process is to create value for customer. Similarly, Isaksson (2006) argued that the process approach is using resources and link the network of activities, enables repeated conversion of an input into output for stakeholders.

W. Edward Deming declared, “Until you draw a flow diagram, you do not understand your business” (Schultz, 1994). Indeed, process mapping or diagramming is the most powerful among quality control and process redesign tools. Johansson *et al.* (1994). Many definitions of processes have been proposed. For example, Eklund (2001) had classified a process as a series of activities, performed or controlled by humans, with the aim of transforming an input into a desired output. They also stressed that the quality movement emphasizes the importance of focusing on the processes that lead to the end result in terms of customer value and satisfaction.

The great idea of process improvement to improve production performance, and to a much higher level than secondary operational improvements, is far from being well understood. Yet, in production, superior performance demands process improvements (Georgantzas & Hessel, 1995). They also stated that production is a network of processes and operations along two distinct streams of activities. Georgantzas and Hessel (1995) had mentioned that in order to improve production performance, quality experts

and managers must emphasize process improvements before operational processes. One of the reasons given for the success of the Japanese is their emphasis on process rather than on product innovation (Kotabe & Murray, 1990; Kraft, 1990; Mansfield, 1988).

Eklund (2001) proposed that a process is defined as a series of activities, performed or controlled by humans, with the aim of transforming an input into a desired output. The quality movement emphasizes the importance of focusing on the processes that lead to the end result in terms of customer value and satisfaction.

2.3.6 Design of Products

Designing is a complex and expensive task that, in general, involves both internal company functions and external resources. While in the past it was improperly considered as an art, nowadays it has acquired an industrial dimension (Franceshini & Rossetto, 1998).

As a result, Motwani (2001) showed that design practices provide an ideal starting point for the study of quality performance. Motwani (2001) mentioned that organizations should consider all the factors when planning for the product design process, understand fully the customer product and service requirements, emphasize fitness of use, clarify specifications and product ability, involve all effected departments in the design reviews, and avoid frequent redesigns.

Regarding the issues of problematic design, Coles (1990) found that the most significant causes of design problems were poor briefing and communication, inadequacies in the technical knowledge of designers, and lack of confidence in preplanning for design work. Josephson and Hammar Lund (1996) found that when measured by cost, design-caused defects were the biggest category. From design-caused defects, those originating from lack of coordination between disciplines are the largest category. In this paper, the researcher suggests that the design of products as mainstream program are to improve design management, and at the same time, as evidenced in the state-of-the-art quality management practices.

2.3.7 Strategy Planning

Strategy planning is matters refer to an organizational vision, mission, strategies and objective is implemented in order to achieve higher performance (Goetsch & Davis, 2010). Previous authors such as (Deming, 1986; Ahire *et al.*, 1996; Zairi, 1994) emphasized that strategy planning process is important factors in total quality. As result, nowadays organizations have taken the strategy planning seriously as a tool that can be utilized in achieving organizational performance. Strategy planning is tends to make the organization in systematic development that can lead more focus organization (Viljoen, 1995).

Drucker (1954) had defined the strategy planning is management by analytical process and plans that focused in organization strategic decisions. It was support by Ansoff (1970) stressed that strategic planning as the process

of enhancement product and market share. Wendy (1987) argued that strategy planning as the process of developing and consistency maintains organization objectives and resources which lead to organizations growth. Many studies are to be done in the relationship between strategy planning and organizational performance in late 1970s and early 1990s. As example, Greenley (1994) claimed that strategy planning has potential advantages that translate into organization performance. Fubara (1986) stressed that the firms with practices strategy planning is more better performance than non-practices the strategy planning.

Furthermore, according to Arasa and K'Obonyo (2012) the process of strategy planning is a shapes company strategy, and clarifies the opportunities which provides framework for decision making for the company success. Elbanna (2010) claimed that strategy planning should be included with involvement in strategies activities and written strategic plans. Meanwhile, Efendioglu and Karabulut (2010) emphasize the strategy planning would consists of strategy techniques, strategy planning issues and planning process. In Table 2.2 described the strategic planning process as propose by Evans and Lindsay (2005).

Table 2.2
Strategic Planning Process

Terms	Explanation
Mission	Defines is reason for existence; it answers the question “Why are we in business”.
Vision	Describes where organization is headed and what it intends to be; it is a statement of the future that would not happen by itself.
Values	A guide the journey to a vision by defining attitudes and policies for all employees, who are reinforced through conscious and subconscious behavior at all levels of the organization.
Environmental	A key factors noted in the leading practices section: customer and market requirements, expectations, and opportunities might effect product or operations
Strategies	Are broad statements that set the direction for the organization to take in realizing its mission and vision
Objective	What an organization must change or improve to remain or become competitive
Action Plan	Are broad statements that set the direction for the organization to take in realizing its mission and vision

Source: Evans & Lindsay (2005).

2.3.8 Information Analysis

Keeping staff informed is seen as a desirable organizational objective and a useful management methodology (Mullern & Elofsson, 2006; Molander, 1996; Bergman & Klefsjo, 2003) emphasize communication through dialogue between people as a key factor for managers to respond to employees’ needs and developing individuals and organizations. According to Molander (1996), communication is even a part of a cultural change and the core of managing change. If a group is to accomplish tasks that enable it

to adapt to its external environment, it must be able to develop and maintain internal relationships among its members and establish a system of communication and a language that permits interpretation of what is going on (Schein, 1999).

The essence of communication is argued to be listening. Therefore, listening skills are central to organizations, and should be reinforced and become embedded in the way managers at all levels do their business. Mohanler (1996); Harnesk (2004) also believe that well-functioning communication depends on people's interest in communication and ability to discuss, as well as using suitable technical support systems. He also explains that the core of communication in dialogue is to be open-minded and to practice active listening, trying to understand the messages and together come to mutual understanding. He further argues that this is to avoid misunderstanding, which is a common source of conflicts.

2.3.9 Continuous Improvement

In quality management practices and effort of continuous improvement have attracted significant influence especially in the last two decades. Marin-Garcia *et al.* (2008) claimed that continuous improvement is an important strategic tool to increase competitiveness in organization. Continuous improvement or kaizen in Japanese word is defined by Imai (1986) as ongoing improvement involving everyone in organization.

Continuous improvement has evolved to an essential part of organizations because of the crucial need to stay competitive in the global market. In other words, continuous improvement evolved something important for all organization and therefore several well developed tools and methodologies exist today (Bhuiyan & Baghel, 2005). In order to improve in innovation performance, continuous improvement has been used to change the process (Dooley and Johnson, 2001).

Sustainable product development can take advantage of continuous improvement by reducing environmental waste, increasing product quality and simplifying the development process. Caffyn (1999) considers continuous improvement as the ability of the company to beat its competitors throughout innovation and the involvement of the employees. Bessant and Caffyn (1997) highlighted that necessity an involvement of the highest number of people possible in the organization and contribute small improvements in products and process and share with others.

According to Dale and Plunkett (1995) there are standard definitions relating to improvement as continuous improvement and quality improvement. Continuous improvement can be defined the means of improvement to people and process performance needs to be continually sought and monitored (Sanderson, 1992) while quality improvement is the actions taken throughout the organization to increase the effectiveness and efficiency of activities and processes to provide added benefits to both the organization and its customers (Sanderson, 1992). As reason, several authors agree that continuous improvement must be integrated into the strategies

goals of the organization (Caffyn, 1999; Lagace & Bourgault, 2003). Commitment in continuous improvement programs must come from the top management (He *et al.*, 2007).

The evaluation of continuous improvement went further when this plan was introduced in Japan. However, the Japanese had their own ideas and further developed the plan by introducing quality control. Because of quality control, continuous improvement grew into a broader term and established itself as a management tool for improving the organization involving all employees (Bhuiyan & Baghel, 2005). To ensure the success of the continuous improvement program, improvement must be sustained by obtaining the audit results. According to Wu and Chen (2006) these achievements of results in terms of improved standards and solved problems will qualify the organization to achieve higher competency of its improvement system.

2.4 Quality Management Practices and Organizational Performance

Benefits of quality management practices can be interpreted in successful organizations in their business operations. It has been shown by Motwani (2001), Hellsten and Klefsjo (2000), and Yang (2006) that the most important goal of quality management practices is improving organizational performance. In addition, Yavas (1995) has found how Japanese organizations used quality management practices to improve their business competition.

Due to the important elements of quality management practices, one can consider organizational performance enhancement as the element to evaluate quality management practice benefits. The findings by previous authors, such as Garvin (1984, 1986, 1988) and Deming (1982, 1986), also discuss several reasons why quality is important to the firm; for example, as quality improves, waste is eliminated, costs are reduced, and firm performance improves, besides there being continuous improvement, leadership and top management commitment.

In addition, according to Ahire *et al.* (1996), quality management practices do not only increase competitiveness and organizational effectiveness, but also improve product quality and organizational performance. Many studies have investigated the notion that TQM practices provide approaches to improve the economic position of organizations in manufacturing and service sectors. Specifically, Powell (1995) suggested that there are significant relationships between TQM, competitive advantage, and business performance. In addition, several studies have succeeded in providing evidence that TQM has a positive impact on financial performance and/or overall performance (Schaffer & Thompson, 1992; Opara, 1996; Arawati & Za'faran, 2000).

In order to be able to compete in the marketplace, many organizations have started to equip themselves with quality management practices. All these activities, such as design, development, manufacturing, assembly, services and documentation, are included in quality assurance (Sroufe & Curkovic, 2008). In a Malaysian case study, Mohamad and Kari (2005) had found several reasons to adopt quality management practices in their organizations, such as customer demand from inside

and outside the country, stiff competition between suppliers, and to achieve accreditation in international markets.

In addition, Mohamad and Kari (2005) stressed that automotive companies should acquire the quality management practices, as long-term benefits increase the effectiveness and efficiency of management process. An example, a study by Arumugam *et al.* (2011) found that such as dimensions of leadership, customer focus, education, quality management, human resources management, process management and service design are important elements in automotive industry studied in Iran country. Similarly, Jirapattarasilp (2011) claimed that such as dimensions of quality management policy, top management, quality activities, usage of quality tools, human resources management, team working, data collection, quality process, cost control and product development are those important dimensions in Thailand industry.

In response, the critical dimensions of quality management practices in automotive industry were illustrated in Table 2.3 which is studied by previous authors. Thus, this study are select nine dimensions of quality management practices, namely human resources management, process approach, product design, customer focus, supplier management, continuous improvement, leadership, strategic planning and information analysis that have influenced on organization performance in Malaysia automotive industry.

Table: 2.3

List of critical success factors in the automotive industry

No	Authors	Country	Quality Management Practices
1	Ahire and O'Shaughnessy (1998).	US and Canada	Customer focus, supplier quality management, employee empowerment.
2	S. Kasolang (2001)	Malaysia	Leadership, strategic planning, customer & market focus information & analysis, HRM, process management, business results.
3	N. Isac (2004)	Romania	Customer focus, continuous improvement, employee empowerment, use of quality tools, product design, management supplier quality
4	S. Park, Y.S. Kim & P. Chan (2006).	Korea	Process management, human resources, top management strategies.
5	H.R. Zadry & S.M. Yusof (2006)	Malaysia	Measurement & feedback, management leadership, work environment & culture, system and process, supplier quality management, continuous improvement, education & training, resource management
6	M.N. Zakuan, S.M. Yusof & S. Shamsudin (2007)	Malaysia	Quality leadership, customer focus and satisfaction, quality information and analysis, HRM, strategic planning, supplier quality management, quality result, quality assurance
7	B.M. Deros, M.N. Ab. Rahman, J.A. Ghani, D.A. Wahab, M.H. Hashim, & N.K. Khamis (2008)	Malaysia	Top management commitment, training, decision on fact, teamwork, and internal/external customer focus.

Table: 2.3 (Continued)

List of critical success factors in the automotive industry (Quality Management)

No	Authors	Country	Quality Management Practices
8	I. Osman, H. Ali, W.E.W. Rashid & K. Jusoff (2009)	Malaysia	Management leadership & commitment, continuous improvement, total customer satisfaction, employee involvement, training & education
9	N.T. Putri & S.M. Yusof (2009)	Malaysia and Indonesia	Management responsibility, resources management, people management, quality design and process, measurement analysis & feedback, supplier management, customer focus.
10	P. Punnakitikashem, T. Laositihongthong, D. Adebajo, M.W. McLean (2010)	ASEAN	Leadership, strategy & planning, customer focus, information & analysis, people management, process management, supplier involvement
11	Arumugam, VC, A. Fallah, & R. Mojtahedzadeh (2011)	Iran	Leadership, customer focus, education and training, quality management, human resources, process management, service design.
12	K. Jirapattarasilp (2011)	Thailand	Quality management policy, quality management method, top management involvement, quality activity, usage of quality tools, human resources, team working, data collection, quality process, cost control & product development.
13	Ramesh (2012)	India	Quality management policy, quality management method, top management involvement, quality activity, usage of quality tools, human orientated, team working, data collection, quality process, product development.
14	Kalra and Pant (2013)	India	Leadership, customer focus, education and training, supplier involvement, teamwork, process management, product design.

2.5 Sustainable Product Development

In 1997, the Environmental Program of United Nations (UNEP) proposed a novel concept to address the concern related to the achievement of sustainable product development. This concept aims to reconsider the relations among the different areas of the economy, environment, and society (Hemming *et al.*, 2004). Meanwhile, another option that should be included in the broad array of human needs, and in both technological and economic instruments, has been conceived (Lagerstedt, 2003). However, a challenge remains in that there is still a lack of common understanding of the scope of sustainable product development.

To solve the aforementioned challenge, the World Commission on Environment and Development (WCED, 1987) provided a common definition of sustainable development: to meet current needs without compromising future needs. Furthermore, the United Nations Conference on Environment and Development (UNCED), also called the Earth Summit or the Rio Conference, launched an action plan in 1992 called “Agenda 21” which contains principles of sustainability for various categories, such as environmental, economic, social, and peace (UNCED, 1992).

In the basic concept of sustainable product development—a core activity for increasing competitiveness in the business environment—the development of new products and improvement of processes are both involved (Ritzen & Beskow, 2001). However, Frei (1998) claimed that there is a weak link between environmental management and product development, suggesting that environmental requirements must be integrated using a systematic approach. Similar to this, Keldman (1997) claimed that environmental performance could be improved concurrently with business performance through product development.

The sustainability of new product development techniques should be considered to ensure survival and long-term competitive advantage in the automotive industry. In addition, matters concerning the environment, economy, and society should also be included (Nunes & Bennet, 2010). As mentioned by Porter (1999), companies must build advantages rather than just eliminate disadvantages. Thus, it is no longer enough to assess firm performance simply through the quality of its orientation, competencies and capabilities maintenance, quick removal of negative quality gaps, and positive quality assurance to attract customers in the automotive industry (Ishioka & Yasuda, 2009).

Zairi and Liburd (2000) emphasized the importance of developing the capability to adapt to changes in the business environment so that firms can employ contemporary best practice methods as well as achieve and maintain superior competitive performance, which includes sustainable product development. Furthermore, Quinn (2000) described sustainable product development as meeting present needs without compromising future needs. However, without sustainable product development, total quality management (TQM) would not be too beneficial (Curry & Kadasah, 2002). Therefore, in this research, we draw upon the concept of sustainability to examine sustainable product development in the automotive industry, considering the economic, environmental, and social issues as compulsory elements in the new product development practice.

The advantages of considering the environmental, economic, and social issues in the sustainable product development of new products have been proven by many studies. One example is the study of Ricoh (2009), who identified possible solutions by reducing the environmental impact on the society as a whole, disclosing information, and working with the local communities. To achieve a sustainable product development in the automotive industry, there is a need to integrate long-term goals for quality management and environmental management (Azorin *et al.*, 2009). Hence, in the current study, we

propose a sustainable product development strategy that also considers the economy, environment, and society as contributing factors to improve the organizational performance of Malaysian automotive vendors. These firms stand to benefit from our findings by achieving competitive advantage in the industry.

Table 2.4

List of critical success factors in the automotive industry (Sustainable Product Development)

No	Authors	SPD in Automotive industry
1	Mayer (2000)	GHG emissions from cars
2	Orsato and Wells (2007)	Car life cycle
3	Smith and Crotty (2008)	End of life vehicle
4	Steenberghen and Lopez (2008)	Alternative fuels
5	Zhu <i>et al.</i> (2008)	Reduction of air emissions, waste water and solid wastes, decrease in consumption of hazardous, decrease environmental accident.
6	Fournier (2009)	CO2 emission of cars, affordable mobility
7	Hensley <i>et al.</i> (2009); Perujo and Ciuffo (2010)	Electrics cars
8	Notter <i>et al.</i> (2010)	Environmental impact assessment of electric vehicles.
9	Steinweg (2010)	Approaches to the environmental issues
10	Thun and Muller (2010)	Packing and waste reduction, eco-friendly process and products in supply chain, raw material decrease, reuse of material.
11	Nunes and Bennett (2010)	Green building, eco-design, green supply chain, green manufacturing, reverse logistics, innovation.

2.5.1 Economic of Sustainable Product Development

In recent years, sustainable product development has evolved in consideration based on the use of triple bottom line which known as economic, environment, and society (Hemming *et al.*, 2004). On other view, Reinhardt (2000) has approaches that company for an integration of sustainable development into overall position of the product into their business strategy. Whereby, Van der Hoek (2002) emphasized that other important issue is need to consider of customer willing to pay for green product.

The automotive industry has made remarkable positive contributions to the world economy and people's mobility, however its products and process are a significant source of environmental impact (Nunnes & Bennet, 2010). Total automotive world production will reached more than 53 million units in 2007 and if commercial vehicles are incorporated this increase to 73.10 million units (OICA, 2007). According to Katayama and Bennet (1996) the challenges of cost competition and vicious cycle in which manufactures, including automotive companies have been drawn. They also argued that companies in particular those in Japan, cannot rely any further on the benefits of lean production alone as the rules of competition that environmental has changed from the 1980s to 1990s. In fact, in the twenty-first century the rules are changing again and there is increasing pressure for the adoption of environmentally friendly processes and greener products. Wackernagel and Rees (1996) claimed that environmental concerns must go beyond mere

efficiency gains but also encouraging efficiency leads to increasing consumption, which increases the overall use of resources.

2.5.2 Environment of Sustainable Product Development

The concept of sustainable development has emerged in the 1970s out of a general concern about the global environment as a result of pollution and an increasing usage of sources of raw materials and energy (De Ron, 1998).

Berry and Rondinelli (1998) mentioned that rapid changes on corporate environment in late 1990s may validate predictions of environment conscious among business leaders in new industrial revolution in the twenty first century. According to Hart (1997) that environmental sustainability is need to protect the environment matters and conserve natural resources where is currently have value of embracing the most competitive and successful multinational companies. In general, primary concern of most organization business is to manage their environment impacts with effectively and efficiency manners (Berry & Rondinelli, 1998).

2.5.3 Society of Sustainable Product Development

The concept of sustainability can be traced back in late thirteenth century but in more recent times it appeared in the environmental literature in the 1970s (Kamara *et al.*, 2006). And since then it has attracted increasingly widespread attention among authors, Diesendorf (2000) argued that

sustainability can be seen as the goal of a process it called sustainable development. Most specifically, there are sets of definition that recognize that all human being live on one planet with finite quantities of natural resources and fragile ecosystems on which all human life ultimately depends (Jones *et al.*, 2010

Today environmental issues have been increasingly integrated into international trade, and markets and consumers worldwide are increasingly demanding environmental friendly products (Anbumozhi & Kanda, 2005). According to Banerjee (2001) claimed that environmental problem today have expanded from local and regional to global stage. In expanding the understanding of the global issues the term triple bottom line has been use as a paradigm to appraise the success of an organization. Newport *et al.* (2003) defined that as the balance sustainability exist from three different aspects known as the environment, social, and economics as three legs of sustainability. Meanwhile, Hall and Matthews (2008) argued that based on the principle of triple bottom line, the organization have started to be concerned about the degree of their organization success defined as sustainable development and associated with implication on societal issues.

Human needs prevention on damaging the environment and depleting nonrenewable resources. According to Hoffman (2000) claimed that environmental issues have awaked the public to concern about the recovery of the ecological system and human survival. As countermeasure to this issues, manager are increasingly asking on how organization can improve sustainability performance and the system, or structure that can be created to

improve corporate social performance (Christman, 2000; James, 2000). For Malaysia industry economy it has moving forward to be industrialized zone and shift from material production to manufacturing.

2.6 Sustainable Product Development and Organizational Performance

Sustainability is a changing mindset from plenitude to limitation, efficiency to equity, and where management philosophers consider limitations to the world's capacity (Galdwin *et al.*, 1995; Dresner, 2006). Becker *et al.* (1997) argued more into detail that companies should not only focus on enhancing its value through maximizing profit and outcome but concentrate on environmental and social issues equally. According to Fowler and Hope (2007) sustainability in organizations is more effected by external influences due to the specific sustainability orientation on a macro level.

At the core, sustainability is a moral obligation that moves beyond the confines of CSR. This moral argument realigns traditional management perspectives towards what is worth pursuing from what works (Gladwin *et al.*, 1995). Dyllick and Hockerts (2002) cited in Zink (2007), provide a well-grounded definition towards sustainability within the corporate world; based on the three-dimensional concept, a sustainable corporation considers not only economic but also social and environmental prerequisites and the impacts of its actions as well as the interdependencies between them. The principle focus of processes, inspection and output found within the ubiquitous concept of quality management has evolved to a holistic consideration of management and implications upon output within a product or service (Isaksson, 2006).

Svensson (2006) also acknowledges a move away from a traditional focus on manufacturing and products to the application of quality concepts and ideas inherent within services (Haskett *et al.*, 1997; Lovelock, 1994). According to Rocha *et al.* (2007), the maximization of product quality, can enhance the non-customer expectations. This premise supports a shift in the traditional business paradigm to one that supports a third-generation quality management movement (Garvare & Johansson, 2010).

Foster and Jonker (2003) observe that third generation quality management as an outward-facing process that evaluates the influences of key external influences, namely stakeholder needs and expectations and the complex web of society. Development BSI 8901, the British standard for sustainable event management, entitled “Specification for a sustainable event management system with guidance for use” (BSI, 2007), aims to assist managers in improving their resources efficiency, reduce their carbon emissions and finally create positive social and economic impacts for the long term (BSI, 2007).

The relationship between sustainable product developments of critical dimensions on organizational performance, previous authors such as Melyk *et al.* (2003) claimed that ISO 14001 certification, King and Lenox (2002) stressed on the pollution reduction. In summary, Table 2.5 illustrated the dimensions of sustainable product development that have relationship on organizational performance that have been studied by previous authors.

Table 2.5

Dimensions of Sustainable Product Development on Organizational Performance

Author	Descriptions
Sharman and Vrebenburg (1988)	Proactive environment strategy
Edwards (1988)	Impact monitoring, supplier rating
King and Lenox (2002)	Pollution reduction
Melynk <i>et al.</i> (2003)	ISO 14001 certification
Author (2014)	Economic, Environment and Social

2.7 Quality Management Practices and Sustainable Product Development

The theme of societal effects on quality management was touched upon already by the classic scholars. For instance, Deming brought up several societal aspects in his texts, notably the problems of health and the judicial system (Deming, 1986). Ishikawa also emphasized the value of quality management for the development of the society and the interaction between society and industry (Ishikawa, 1985). In the later comprehensive works in the area, societal influences are touched upon more indirectly (e.g. Bergman & Klefsjo, 1994; Dale, 1999; Foster, 2005). Societal aspects are also hinted at in research concerning the core values of quality management (e.g. Hellsten & Klefsjo, 2000).

There is an increasing trend towards improved environmental performance and socially responsible business practices (Axelrod, 2000). Thus, the challenge for the future development of TQM is to ensure TQM-based environmental standards are ‘both proactive in nature and dynamic in their evolution’ (Allen *et al.*, 2000).

Sustainability of the firms’ performance through quality orientation is therefore about maintaining competencies and capabilities to remove negative quality

gaps quickly and create positive quality to attract customers. In the words of Porter (1999), “companies must build advantages rather than just eliminate disadvantages”. As Kondo (2001) insisted that must have quality could avoid dissatisfied customers, but that attractive quality could amaze customers. Sustainability in the past was characterized by different orientation ranges, from product, service, customer, and market, beginning around 1960 to the 1990s (McDonald & Lane, 2002).

2.8 The Role of Sustainable Product Development as Mediating in effect of Quality Management Practices and Organizational Performance.

There are a number of approaches to conceptualize TQM practices (Oakland, 2004; Rao *et al.*, 1996; Terziovski & Samson, 1999). The first approach is by adopting the concepts and methods suggested by quality gurus such as Deming (1982), Juran (1988), Crosby (1979), and Ishikawa (1985) while second approach uses ISO 9000 framework and principles. The third approach uses quality award framework such as Malcolm Baldrige National Quality Award (MBNQA) (Baldrige, 2006) and the European Foundation for Quality Management (EFQM) framework (EFQM, 2006). Finally, the fourth approach is based on empirical evidence or critical success factors in real practices (Black & Porter, 1996; Kanji & Tambi, 1999; Terziovski & Samson, 1999). Thus, total quality management is one of the most durable management innovations of the past three decades and it has been implemented worldwide in service, manufacturing, private, public, large and small organizations (Ghobadian & Galler, 1996).

Environmental concern has created the concept of eco-performance, which encompasses the socio-environmental impacts that a product has beyond the company and its marketplace (Peattie, 1995). Moreover, environmental concerns are leading to new customer requirements beyond conventional functionality, quality, and cost, relating to how products are made, how long they last, and how they can be disposed of (Peattie, 1999).

Meanwhile, sustainable product development requires questions to be asked about the physical consequences of production and consumption. Addressing questions about where the raw materials are going into, where the products come from, and what happens to products post-use, reflect a physical cradle to grave product life cycle perspective (Sharman *et al.*, 1997). Some of authors such as Wheeler (1992) had focused on the environmental new product development and suggested that one should give attention to the fate of products post-use and particular design for the five R's of repair, reconditioning, reuse, recycling, and remanufacturing.

In Figure 2.1 illustrated the previous studied on the relationship variables of quality management practices, sustainable product development, and organization characteristics on relationship to organizational performance.

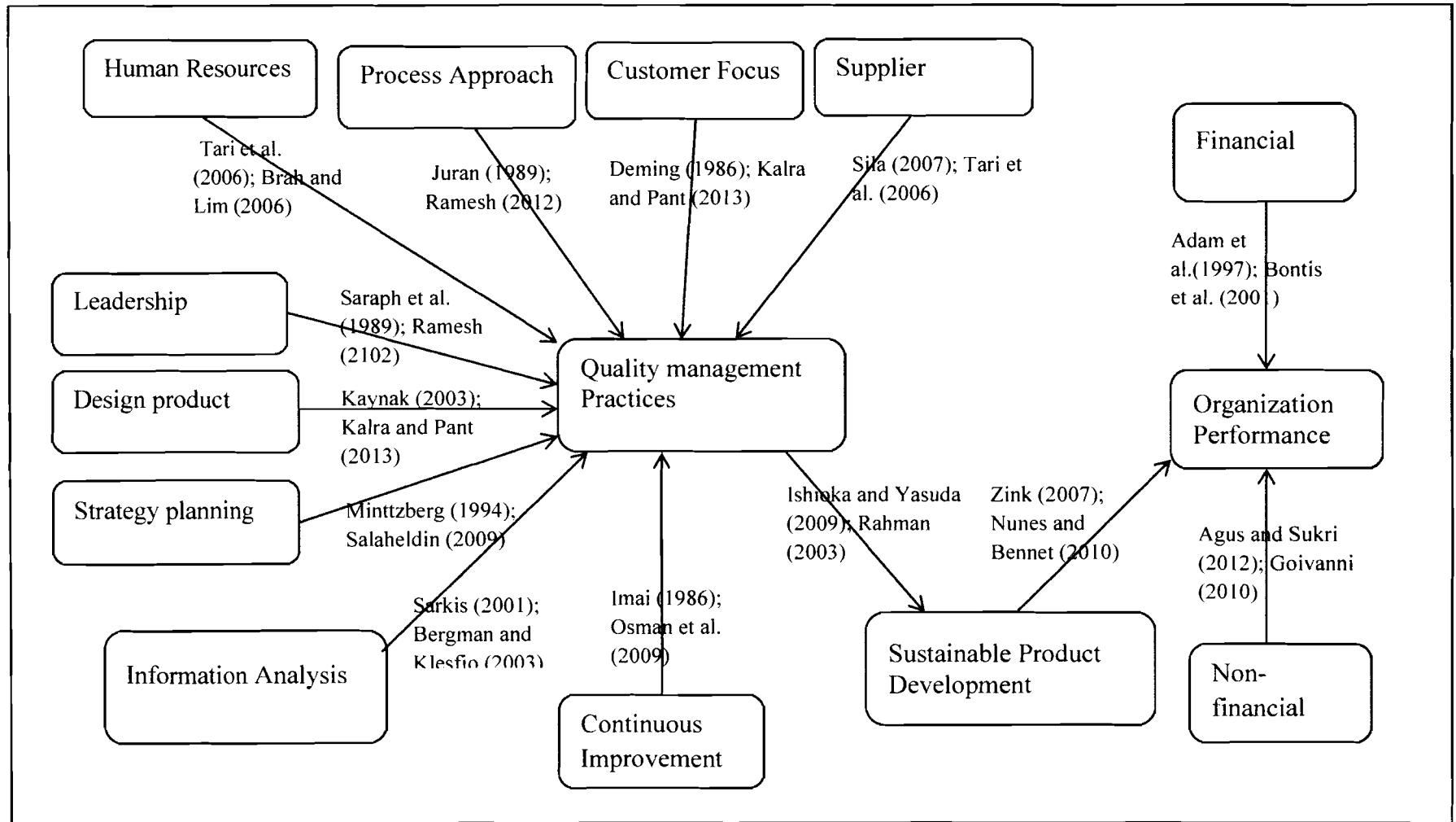


Figure 2.1
The Relationships of Study Variables

2.9 Organization Characteristics

It is generally believe that quality management practices would be succeed if implementation take some consideration as a major organizational change and a long term paradigm shift, rather than short term implementation. Among the criteria required as organizational characteristics. As such, according to Ahire and Rana (1995) argue that quality management practices requires significant investment in terms of financial, technical, and human resources over several years before achieving the desired result.

Many previous study on the relationship of size of firms (Gagnon & Toulouse, 1996; Germain, 1996) and ownership of firms (Ahire *et al.*, 1996; Swamidass & Kotha, 1998) with influences the relationship to quality management practices in the organization. Furthermore, this study will investigate the moderating of size of firms, ownership of firms, and the length of time quality management adoption.

2.9.1 Size of firms

Majority of studies in quality management practices are focus on large multi-national organization. Moreover, quality of products has become the basis of global competition for all organization regardless of size and location (Temtime, 2003). Meanwhile, Wiele and Brown (1998) argued that larger organization will not be able to improve the quality of their products, services, and processes, unless their supplier or second-tier supplier has adopted higher level of quality. Amongst the supplier be known as SME's. However, SME's itself having their unique characteristics compare to larger

organization (Temtime, 2003). Among the characteristics study by Yusof and Aspinwall (1999) are structure, systems and procedures, culture and behaviors, human resources, markets and customers.

According to Hartz and Kanji (1998), SME's can be characterized as easy to understand and survey, and good communication and flexibility to implement new management philosophies and approach. Ghobadian and Gallear (1996) found that visibility of leadership and team improvement activities much easier in SME's. However, SME's also having several issues that effect the implementation of quality management practices in their organization. Amongst the issues are human resources management (Hornsby & Kuratko, 1990), lack of proper training and education (Djerdjour, 2000). Nevertheless, in developing countries it can be increased their trade activities and sustainability by improving the quality of products and services (Temtime, 2003). Increasing competitive world, quality of product is no longer an optional agenda because it is essential strategy for all organizations regardless the size of firms (Temtime, 2003).

2.9.2 Ownership of firms

A firms's "owner" as the term is conventionally used and can be defined are those persons who share two formal rights were is the right to control the firm and the right to appropriate the firm's residual earnings (Hansman, 1988). Firms performance depends upon both carefully designed and advised strategic decisions taken on the part of the entrepreneur of a positive development that takes place. An example study by Fama and Jensen

(1983) studied the advantages and the potential problems which the ownership structure may pose to the performance of the organization.

Barontini and Caprio (2005) studied the relationship between firm performance and ownership structure in 675 publicly traded companies spread out in 11 different countries throughout the continental Europe and found that most corporate of Europe exhibit concentrated ownership structures. Meanwhile, Harvie and Naughton (2000) studied on Korean listed firms classified on three type of ownerships found that it will create firm value and performance. From above finding it shown that ownership of firms has significance values to organization performance.

2.9.3 Length of time QM Adoption

The implementation of quality management practices should not be treated as one-off implementation (Lee *et al.*, 2009). It should be implemented as long term agenda, whereas quality management practices requires persistent action and strategy in continuous efforts (Yaacob, 2010). According to Sohal and Terziovski (2000) short term of quality management practices is probability illusive result compared to long term program. An example, Sun (2000); Hendriks and Singhal (2001) claimed that quality management practices adopters is better performance compare is non-quality management practices adopters.

Different effort of quality management practices being in place it would have different on its result. An example, Costa and Lorente (2007)

found that an organization would only gain positive effects of quality management practices if the implementation was done seriously. Meanwhile, Prajogo and Brown (2006) claimed that there are significant different between minimum effort and fully committed to practice quality management practices in the organization.

2.10 The Role of Organization Characteristics as Moderator that influence the Quality Management Practices on Organizational Performance.

One of research aim is to determine influences of organization characteristics that can effect the implementing of quality management practices on organizational performance in automotive industry. Several organization characteristics criteria have been studied by authors and revealed that there are positive relationships with management practices in implementation of quality management. An example, Hoang *et al.* (2010) claimed that organization characteristics that consist of size of firms, type of industries, type of ownership, and degree of innovation in Vietnam industry.

Consequently, there are many previous studies reveal that the organization characteristics have positive relationship with quality management practices in the organization. Gagnon and Toulouse (1996); Germain (1996) size of firms, Ahire *et al.* (1995), Swamidass and Kotha (1998), Germain (1996), ownerships of firms, Powell (1995) length of time quality management adoption in organization. However, there are contradicted finding of organization characteristics in relationship with implementation of quality management and organizational

performance. Benson *et al.*, (1991) claimed that size of firms is not directly related to quality management practices. Arawati (2008) have revealed that length of time quality management practices not have significance relationship with organizational performance in Electric and Electronics industry in Malaysia.

The significance contributions of organization characteristics and their outcome have been discussed in varies relationship. Example, Hoang *et al.* (2010) studied direct relationship with organization characteristics as independent variable and quality management as dependent variable. Choong and Rundus (2004); Haar and Spell (2008) studied that the organization characteristics as moderate relationship between quality management and organizational performance. As result, this study will examine the organization characteristics (size of firms, ownership of firms, and length of time quality management practices adoption) as moderator that can influence the implementation of quality management practices on organizational performance.

2.11 Organizational Performance

According to Roberts (2001) performance management involves the setting of corporate, departmental, team, and individual objectives (sometimes labeled ‘policy deployment’, the cascading down of strategic objectives to a meaningful set of targets for every individual involved); the use of performance appraisal systems; appropriate reward strategies and schemes; training and development strategies and plans; feedback, communication, and coaching; individual career planning;

mechanisms for monitoring the effectiveness of performance management systems and interventions and even culture management

Evans and Lindsay, (2005) have stated that traditionally, most businesses relied on organizational performance data based almost solely on financial or accounting-based factory productivity considerations, such as return on investment, earnings per share, direct labor efficiency, and machine utilization. (Kaplan & Norton, 1992). Unfortunately, many of these indicators are inaccurate and stress quantity over quality (Huge, 1990). In Table 2.6 was illustrated the organization performance measures used by various authors.

Zack *et al.*(2009) claimed that organizational performance measures should include with innovation, quality of product, customer satisfaction, customer retention, operating cost, return of assest and profitability. Meanwhile Zheng at al. (2009) argued that the performance of organizational should measure of product leadership, customer intimacy, operational excellence and financial performance. In this study the organizational performance will be measured by financial and non-financial.

Table 2.6
Measures of Organizational Performance

Authors	Organizational Performance Measures
Powell (1995)	Financial performance, sales growth, revenue growth, and TQM program performance.
Terziovski and Samson, (1999)	Customer satisfaction, Productivity, Employee morale, Quality of output, and Delivery performance.
Kanji and Tambi (1999)	Demand for product or service, Product life cycle, Productivity, Customer satisfaction, and financial performance.
Sun (2000)	Product quality and customer satisfaction, Productivity and Profitability, Market position and Competitiveness, Environment protection and Employee satisfaction.
Hung and Lien (2004)	Competitive position, Production, Profitability, Service quality, Cost
Srivastava <i>et al.</i> , (2006)	Quality performance, Business result, Customer satisfaction, Time dimension and Human Resources
McKeen <i>et al.</i> , (2006)	Quality performance, Business result, Customer satisfaction, Time dimension and Human Resources
Zheng <i>et al.</i> , (2009)	Product leadership, Customer intimacy, Operational excellence and financial performance
Zack <i>et al.</i> , (2009)	Innovation, Quality, Customer satisfaction, Customer retention, Operating cost, ROA/ROE and Profitability

2.11.1 Financial

The measuring of financial performance it can be based from accounting data of the organization (Hart & Ahuja, 1996; Russo & Fouts, 1997). It always uses financial term in order to determine the organizational performance (Neely, 1999). In this study, the financial performance will be measured based on profit (Adam *et al.*, 1997; Bontis *et al.*, 2001; Agus & Sukri, 2012), sales growth(Forker *et al.*, 1996; Bontis *et al.*, 2001; Agus &

Sukri, 2012) , cost reduction (Buttle, 1996; Sani Sanury, 2007; Chien & Shih, 2007), return of investment (Sin & Tse, 2000; Li, 2000; Neely *et al.*, 2001), cash flow (Anderson & Sohal, 1999; Love & Holt, 2000) and return of asset (Bontis *et al.*, 2001; Forker *et al.*, 1996).

2.11.2 Non-Financial

Performance measurements are categorized as a data of information that used to determine the organizational performance. Until recently, the financial and non-financial are used as measurement performance by an organization. The financial element are measured the elements of profit before tax, turnover, and return of investment while the non-financial elements measurement more focus on customer satisfaction, delivery time, employees' turnover (Chong, 2008).

There are facts that different results were obtained by considering the different determinants of non-financial performance measures used. According to Zuriekat *et al.*, (2011) more variety of non-financial performance measures results in more benefits to organization. As reason, this study has revealed that ten items to be measured in non-financial performance. Bontis and Nikitopoulos (2001); Caruana and Pit (1997); Pitt *et al.*, (1996) measures the overall business performance. Sani Sanury (2007), Neely *et al.*, (1996), on customer satisfaction. Sani Sanury (2007); Love and Holt (2000) of productivity related issues. Sani Sanury (2007), Buttle (1996) of process efficiency. Pitt *et al.*, (1996), Mohd Khairuddin (2000) of employments

satisfaction. Agus and Sukri (2012), Giovanni (2010), Melynk *et al.*, (2003) of market share. Pujari *et al.* (2004), Rao and Holt (2006) of gain new market. Rao and Holt (2006) of product pollution awareness among staff. Chien and Shih (2007), Buttle (1996), Rao *et al.*, (2006) of product emission issues. Chien and Shih (2007), Rao and Holt (2006) of energy usage in the organization.

2.12 Automotive Industry in Malaysia

The Malaysian automotive industry has definitely come a long way since its birth in the early 1980's. It is a common understanding that the former Prime Minister, Tun Dr. Mahathir Mohamad was passionate and a firm believer of the Malaysian automotive capabilities meeting the rising demands of a growing nation (Zamri, 2008). Today, the industry contributes significantly to the country's development in terms of creating skilled employment, deepening its research and development capacity, and strengthening manufacturing assembly capabilities. The automotive industry has also played a catalytic role in the growth and development of other related industries.

Throughout history, the Malaysian government had encouraged the setting up of a local automotive assembly plant in 1960. The main objectives of these directions were to minimize the imports of completely built-up units (CBU) that would simultaneously benefit the Malaysian economy in terms of the employment rate and technology transfer. In 1985, the Malaysian automotive industry reached a historical moment when the first model of a national car was launched.

The development of national car projects was a step towards the Malaysian automotive industry creating integrated motor vehicle vendors, where the growth of local components had increased to 350 manufacturers in Malaysia. As a result, the automotive industry succeeded in fulfilling the government's industrialization efforts to enhance the country's economy. In terms of employment, 23,391 employees were employed in the automotive industry in 2003 (Zamri, 2008).

In 1992, as a member of the ASEAN countries, Malaysia signed an ASEAN Free Trade Area (AFTA) agreement, which agreed to lower tariffs to a maximum of 5 percent on product taxes by 2003. However, these products should have at least contents of 40 percent local parts. The main objective of AFTA was to increase ASEAN's competitive edge as a production base for the world market, which would be realized through the elimination of intra-regional tariffs and non-tariff barriers, and allowing manufacturing sectors to become more efficient and competitive.

According to Peixoto (1995), one of the key strategies in achieving Malaysia's Vision 2020 was that Malaysian companies should assess the criteria of strategic intent, competitive marketing, quality products, competitive innovation, competitive human resources management, sense of national pride, and professionalism. As a result, the Malaysian domestic motor vehicles market represents about 30 per cent of the total demand in the five largest ASEAN economies (Zamri, 2008).

Different countries have differences type of SME definitions including the Malaysian industry. However, the SME Corporation of Malaysia have defined common definitions across the economics sector and that adopted by all government ministries and agencies involved in SMEs development. In Table 2.7 illustrated the

definition of SME based on sales turnover by SME Corporation of Malaysia. In Table 2.8 illustrated the definition of SME based on number of employees by SME Corporation of Malaysia.

Table 2.7

SMEs Definition in Malaysia. (Sales Turnover)

Category & Size of firms	Manufacturing Sector	Service Sector
Micro	Below RM250,000	Below RM200,000
Small	RM250,000 to RM10 million	RM200,000 to RM1 million
Medium	RM10 million to RM25 million	RM1 million to RM5 million

Notes: Taken and adapted from *SME Corporation Malaysia*, Malaysia, 2008,

Table 2.8

SMEs Definition in Malaysia. (Employees)

Category & Size of firms	Manufacturing Sector	Service Sector
Micro	Below 5 persons	Below 5 persons
Small	5 to 50 persons	5 to 19 persons
Medium	51 to 150 persons	20 to 50 persons

Notes: Taken and adapted from *SME Corporation Malaysia*, Malaysia, 2008,

2.12.1 Why SME’s are Chosen.

The successful of Malaysia economic growth is depends on SME’s sector in cooperation with large firms. In many countries, multinational corporations (MNCs) have helped accelerate the process of industrialization

(Alavi, 1996; UNIDO, 1995). In 1980, Malaysia has developed manufacturing sector through export-oriented strategies, which has led to the emergence of many firms (e.g. PROTON HOLDING – the national car manufacturer).

Later in 1996 of Sixth Malaysian Plan, the Malaysia government has positioned SMEs as the keystone in the economic and industrial policy (Abd. Hamid, n.d). These actions has been supplemented with the set-up of well-organized agencies such as the Malaysian Industrial Development Agency (MIDA), Ministry of Entrepreneur Development (MED), and the Ministry of Finance (MOF) etc., which illustrates the significance of SMEs to the overall government economic policies. That mean, SMEs sector is compulsory to country economy, creating jobs, and providing the foundations for large company and country's long term growth. Nonetheless, SMEs are seen to have an important future role in generating employment activities, securing home and oversea markets, earning of valuable export revenue, and strengthening of industrial linkages (Wyer & Mason, 1999).

Malaysia is a primary producer and exporter of vehicle parts, components and accessories that have found acceptance in many foreign countries, including Thailand, Singapore, Taiwan, Indonesia, Japan, and UK (Zamri, 2008). And yet, the automotive industry is one of the most important and strategic industries in the Malaysian manufacturing sector. According to Zamri (2008), the Malaysian automotive industries must focus on strengthening the market competitiveness by implementing an effective green

design framework. It also refers to a practice that is intended to yield products whose aggregate environmental impact is as small as possible.

2.12.2 Profile of SME’s Automotive in Malaysia

SMEs have contributed significance relationship with Malaysia economy (Faridah *et al.*, 1999; Baharun *et al.*, 2003; Abdullah *et al.*, 2008). Table 2.9 shows the automotive manufacturing firms on the category, total manufacturing and percentage of sharing in Malaysia economy.

Table 2.9
Total Number of Automotive Manufacturing and Component Firms Registered with SME Development Council of Malaysia as at 12 December, 2010

Category of SMEs	Total firms	% share	No. of Employees Recorded
Micro	862	3.7	Less than 5 persons
Small	13,054	55.3	Between 5 to 50 persons
Medium	9,696	41	Between 51 to 150 persons
TOTAL	23,612	100	

Source: *SME Corporation (2010).*

Table 2.9 show that automotive manufacturing vendors and support automotive manufacturing components of micro firm was 3.7%, small type of industry was 55.3% and medium size of industry was 41%. According to

Moorthy, Tan, Choo, Wei, Pind and Leong (2012) SMEs business in Malaysia representing 99.2% of the entire economy. This study is significant to Malaysia automotive industry in contribution of economic wealth in achieving developing country by year 2020.

Table 2.10 illustrated the relationship in matrix of among variables used in this study. The variables used in this study are namely: quality management practices, sustainable product development, organization characteristics, and organizational performance

2.13 Summary of Research Variables Matrix

Table 2.10

Summary of Research Variables Matrix

Variables	Quality Management Practices	Sustainable Product Development	Organization Characteristic	Organizational Performance
Quality Management Practices		Bergman & Klefsjo, (2003); Dale, (1999); Foster, (2005); Hellsten & Klefsjo, (2000); Axelrod, (2000); Rahman, (2003); McDonald & Lane, (2002); Ishioka & Yasuda, (2009)	Powell, (1995); Benson <i>et al.</i> (1991); Ahire <i>et al.</i> (1996); Brah <i>et al.</i> (2000); Yavas & Rezayat, (2003); Hui <i>et al.</i> (2004); Hoang <i>et al.</i> (2010); Arawati, (2008); Terziovski & Samson, (1999)	Omachonu & Ross, (1994); Nair, (2006); Flynn <i>et al.</i> (1995); Lakhali <i>et al.</i> (2006); Yahya & Goh, (2001); Ramesh (2012)
Sustainable Product Development	Bergman & Klefsjo, (2003); Dale, (1999); Foster, (2005); Hellsten & Klefsjo, (2000); Axelrod, (2000); Rahman, (2003); McDonald & Lane, (2002); Ishioka & Yasuda, (2009)		Reverte, (2009); Monteiro & Aibar-Guzman, (2009); Stanny & Ely, (2008); Freedman & Jaggi, (2005); Al-Tuwaijri <i>et al.</i> (2004)	Zink, (2007); Svensson, (2006); Rocha <i>et al.</i> (2007); Garvare & Johansson, (2007); Shrivastava & Hart, (1994); Pujari <i>et al.</i> (2003); Kolk, (2000); Nunes and Bennet (2010)
Organization Characteristic	Powell, (1995); Benson <i>et al.</i> (1991); Ahire <i>et al.</i> (1996); Brah <i>et al.</i> (2000); Yavas & Rezayat, (2003); Hui <i>et al.</i> (2004); Hoang <i>et al.</i> (2010); Arawati, (2008); Terziovski & Samson, (1999)	Reverte, (2009); Monteiro & Aibar-Guzman, (2009); Stanny & Ely, (2008); Freedman & Jaggi, (2005); Al-Tuwaijri <i>et al.</i> (2004)		Temtime, (2003); Wiele & Brown, (1998); Gagnon & Toulouse, (1996); Germain, (1996); Ahire <i>et al.</i> (1996); Swamidass & Kotha, (1998); Powell, (1995); Arawati, (2008)
Organizational Performance	Omachonu & Ross, (1994); Nair, (2006); Flynn <i>et al.</i> (1995); Lakhali <i>et al.</i> (2006); Yahya & Goh, (2001);	Zink, (2007); Svensson, (2006); Rocha <i>et al.</i> (2007); Garvare & Johansson, (2007); Shrivastava & Hart, (1994); Nunes & Bennet, (2010);Pujari <i>et al.</i> (2003); Kolk, (2000)	Temtime, (2003); Wiele & Brown, (1998); Gagnon & Toulouse, (1996); Germain, (1996); Ahire <i>et al.</i> (1996); Swamidass & Kotha, (1998); Powell, 1995; Arawati, 2008	

2.14 Summary

This chapter is a comprehensive explanation of the literature reviews of variables used in this research. The previous results of studies in the same field are critically discussed and reported. The factors that are relevant to quality management practices, sustainable product development and organizational performance will be summarized in the framework. These variables and hypotheses development will be explained in chapter three.

CHAPTER THREE

THEORETICAL FRAMEWORK AND HYPOTHESES

3.1 Introduction

In this chapter will discuss two main elements, the theoretical framework and research hypotheses. The first element provides the theoretical framework of the study based on the discussion in the literature review and related theories to the present study. The main agenda of this study relationship of QMP (quality management practices) and OP (organizational performance) in automotive industry, as well as investigate the influence of sustainable product development as a mediating role. Meanwhile, the organization characteristics have played as moderating variable. Thus, the aim of this element is to suggest a conceptual framework and model of the study constructs, and then develop hypotheses based on the related literature in the previous chapter. In this second element of this chapter, the research methodology is discussed in detail namely; research design, sampling frame, sampling method, measurement instruments, and evaluation of instrument scales, data collection, and analytical data approach.

3.2 Theories Related to the Study

Basically, three theories are involved in this study, namely, resources-based view theory, institutional theory, and stakeholder theory were considered when developing the theoretical framework for the research. The discussions of these are offered in the following subsections.

3.2.1 Resources-Based View Theory

A theory is a way to describe, predict, and control what is observed in the world (Evans & Lindsay, 2005). The work of resources based view theory are begin associated with the writing of Ricardo (1817), Schumpeter (1934) and Penrose (1959) of root the economic view that gain the profit by firms. Their study is to focus the internal resources of firms that could have achieved competitive advantage. According to Wernerfelt (1984), resources based view theory is any resources could be thought and make the strengthened of organization performance. Meanwhile, Barney (1991) have explore the definition of resource based view theory to more wider scope with included tangible and intangible elements that improve the firm efficiency and effectiveness.

Resources based view theory has advantages, in term of capable resources that generate organization profit and competitive advantage (Wernerfelt, 1984; Amit & Schoemaker, 1993). On other hand, the resources based view proposes the selection of resources within organization that related to external strategic factors such as supplier, buyer, competitors and industry (Oliver, 1997).

In this context, quality management practices dimension are identified as the resources are namely as leadership (Zhang, 2000), human resources management (Mady, 2009; Merino-Diaz, 2003; Flynn & Saladin, 2001), supplier management (Takeishi, 1990; Merino-Diaz, 2003; Anderson & Sohal, 1998; Rao & Holt, 2005;

Ahire *et al.*, 1996; Saraph *et al.*, 1989), customer focus (Karthi, 2004; Flynn & Saladin, 2001; Sani Sanury, 2007; Merino-Diaz, 2003; Mady, 2009; Zu, 2009), process approach (Saraph *et al.*, 1989; Merino-Diaz, 2003; Sani Sanury, 2007), product design (Ahire *et al.*, 1996; Merino-Diaz, 2003; Benito & Benito, 2002), strategic planning (Quazi, 2001; Powell, 1992), information analysis (Anderson & Sohal, 1998; Joseph *et al.*, 1999; Miyazawa & Yoshida, 2005) and continuous improvement (Das & Uma Kumar, 2011, Flynn *et al.*, 1995).

Therefore, the outcome of resources based view of competitive advantage is measured by two dimensions as known as financial and non-financial. The dimensions of financial is identify as profit (Adam *et al.*, 1997; Bontis *et al.*, 2001; Agus & Sukri, 2012), sales growth (Bontis *et al.*, 2001; Agus & Sukri, 2012; Forker *et al.*, 1996), cost reduction (Buttle, 1996; Sani Sanuri, 2007; Chien & Shih, 2007), return of investment (Sin & Tse, 2000; Li, 2000; Neely *et al.*, 2001), cash flow (Anderson & Sohal, 1999; Love & Holt, 2000) and return of asset (Bontis *et al.*, 2001; Forker *et al.*, 1996).

3.2.2 Institutional Theory

Institutional theory emphasizes the role of social and cultural pressures imposed on organizations that influence organizational practices and structures (Scott, 1992). This theory is implied by Jennings and Zandbergen (1995), who were amongst the first to apply

institutional theory to explain the organizations' adoption of environmental management practices.

According to Hoffman and Ventresca (2002), the institutional sociology framework emphasizes the importance of regulatory, normative, and cognitive factors that effect firms' decisions to adopt a specific organizational practice, above and beyond the practices of technical efficiency. However, firms can adopt various types of environmental management practices in response to institutional pressures. As a result of this, Sharma (2000) further explained that there were two conditions to a firm's response to institutional pressures, firstly, there are environmental strategies of conformance that focus on complying with regulations and adopting standard industry practices, secondly, there are voluntary environmental strategies that seek to reduce the environmental impacts of operations beyond regulatory requirements.

3.2.3 Stakeholder Theory

Stakeholder theory is the key point that interests by any organization for determine their survival (Freeman, 1984). Furthermore, he claims that stakeholder theory can be defined as a group have directly and indirectly impact on organizational performance. As such, Donaldson and Preston (1995) have identified there are three types of stakeholder taxonomy is namely normative,

instrumental and empirical. The normative taxonomy is concern on how the organization leadership should deal with corporate stakeholders. The instrumental is related the actual situation of stakeholder engagement and empirical taxonomy is defined the behavior of stakeholder model.

As empirical evidence, Berman *et al.* (1999) claimed that there are caused relationship between stakeholder, organization strategy and financial performance. Furthermore, in their study have defined the stakeholders entities are namely employees, safety issues related to customer was shown that there are positive relationship of stakeholder entities and financial performance.

Phillips *et al.* (2003) claimed that organization survival is depending largely on their stakeholder management. In this context, from theoretical framework where identified that quality management practices has positive relationship with organizational performance. That means the nine variables of QM practices are identified as leadership, human resources management, process approach, product design, customer focus, supplier relationship, continuous improvement, strategy planning and information analysis have contributed to the organizational performance. As support, Scott and Davis (2007) stressed that the sustainability of organization not merely depend on single group, but it should emphasized for multiple group for their success.

An example, Eklund (2001) claimed that European and Scandinavian country are more emphasized on the stakeholder business model, in which consider the interests of the customers, owners, and the employees. Thus, the outcome will create customer satisfaction, and long-term company success (Ennals, 1999).

3.3 Theoretical Base of the Study

In general this study are integrated the resources based view theory, stakeholder theory and institutional theory. Resource based view theory is related to competitive advantage by organization (Wernerfelt, 1984). In other words, the organization are utilized any resources and capabilities to achieved business objective and their capabilities (Amit & Schoemaker, 1993, p.13). The resource based view offers as underpinning theory for this study of quality management practices and organizational performance.

Similarly, institutional theory stressed that there are advantage to firm to adopt environmental management practices on product development (Jennings & Zandbergen, 1995), societal framework (Hoffman & Ventresca, 2002), environmental strategies (Sharma, 2000). Underpinning theory this study are applied to the sustainable product development and organizational performance.

Involvement the entities have played important role of sustainability in business. Foley (2005) defines those entities is who are interested in activities are able to make the organization out in business, if their requirement are not

satisfied. As reason, underpinning theory of stakeholder theory is to attempts all these meets.

To address all of the above issues, Figure 3.1 shows the integration of theoretical framework of quality management practices and organizational performance with sustainable product development act as a mediator variable, while organization characteristics act as moderating variable. An exhaustive literature review on the subject quality management practices, sustainable product development, organization characteristics, quality management practices and organizational performance. Relatively this study also investigates how the sustainable product development could effect these relationships and what condition an organization characteristic can moderate interrelationship among variables.

3.4 Theoretical Framework of the Study

The following step of this research is to develop the theoretical framework, after conducting a review of the literature, and defining the research problem. Gay *et al.* (2009) have defined that theoretical framework is a guide and conceptual model of how one theorizes or makes logical sense of the relationships among the several factors that have been identified as important to the problem. In sum, the theoretical framework discusses the interrelationships among the variables that are deemed to be integral to the dynamics of the situation being investigated (Zikmund *et al.*, 2010). From the theoretical

framework, testable hypotheses are being developed to examine theoretical validity.

In addition, developing theoretical framework helps us to postulate or hypothesize and test certain relationships, and thus to improve our understanding of the dynamics of the situation (Hair *et al.*, 2010). Based on theoretical foundation reviewed in the literature, a framework has been developed to investigate the QMP and OP; the mediating of sustainable product development and the moderating of organization characteristics in automotive industry. Table 3.1 illustrates the relationship constructs in this study.

Table 3.1
Description of Research Variables

IV	Mediating Variables	DV
Human Resources Management	Economic of SPD	Financial
Process Approach	Environment of SPD	Non-Financial
Design of Product	Society of SPD	
Supplier Relationship		
Customer Focus		
Leadership		
Continuous Improvement		
Strategy Planning		
Information Analysis		
	Moderating Variables	
	Size of Firm	
	Ownership of Firm	
	Length of time QM Adoption	

Figure 3.1 illustrated the theoretical framework of this study. The figure also shows the mediating role of sustainable product development. Whereas an organization characteristics as the moderating role. The theoretical framework of a study is structured in Figure 3.1 it can support a theory of research framework and serves as a basis for conducting the research.

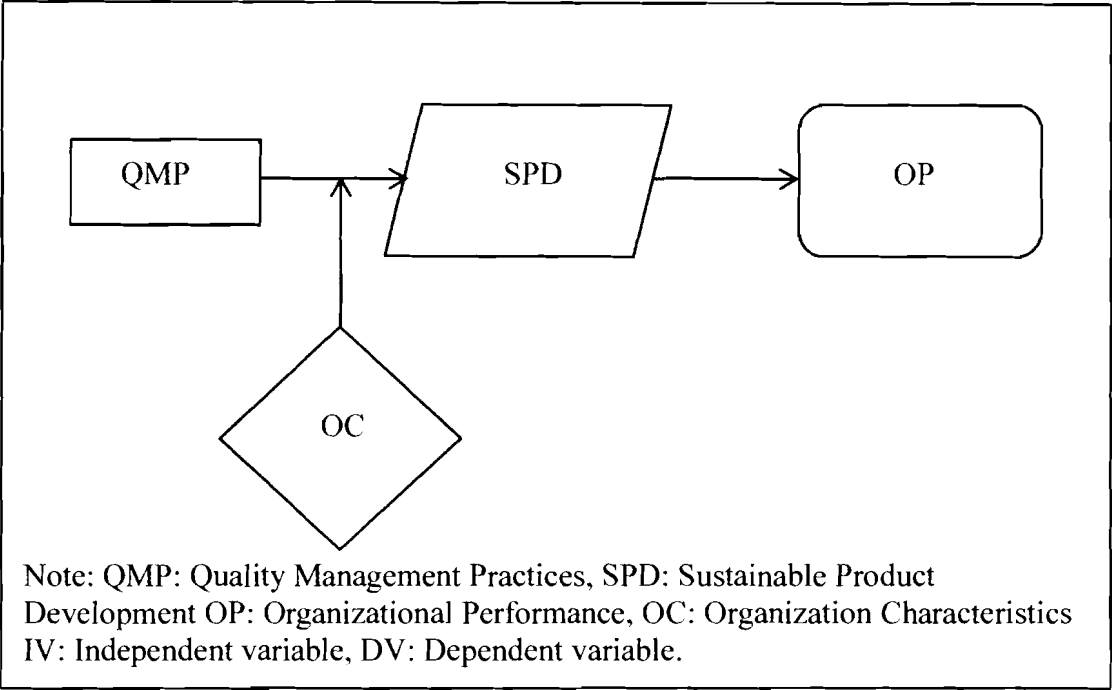


Figure 3.1
Theoretical Framework of the study

3.5 Research Hypotheses

This section discusses the hypotheses of this study. The development of hypotheses is based on the theoretical framework. In this section the researcher investigates the relationship between the independent variable, mediating

variable, moderating variable, and the outcome variables. Independent variables of quality management practices in this study consists of leadership, human resources, supplier management, customer focus, process approach, design of product, strategy planning, information analysis, and continuous improvement. Meanwhile, the mediator variable is sustainable product development and moderator variable is organization characteristics. The dependent variable is organizational performance. The descriptions of the hypotheses for each element are mentioned in the following subsections.

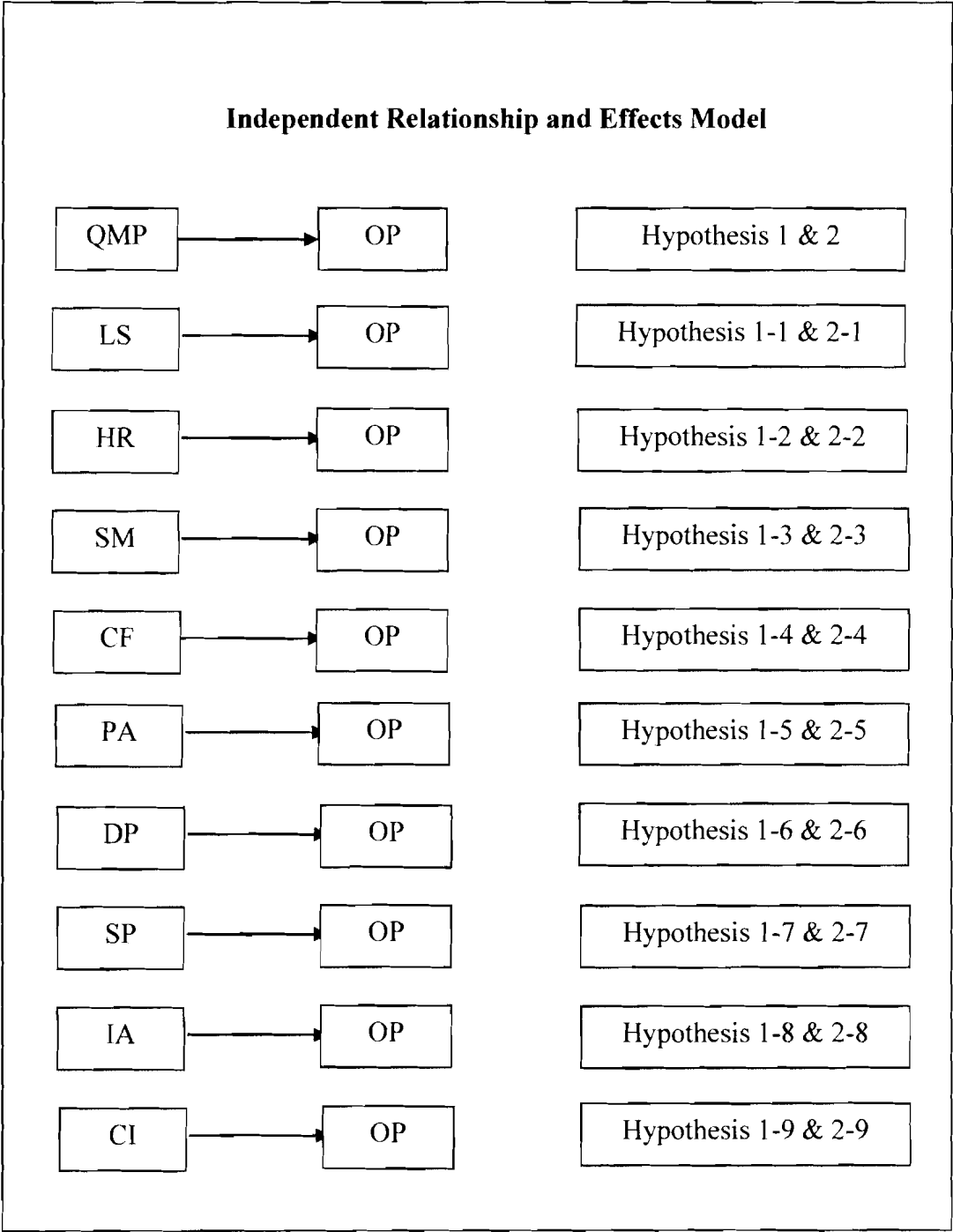


Figure 3.2

Breakdown the model of QMP and OP.

Note: QMP (Quality management practices), LS(leadership), HR(Human resources), SM(Supplier management), CF(Customer focus), PA(Process approach), DP(Design of product), SP(Strategy planning), IA(Information analysis), CI(Continuous improvement).

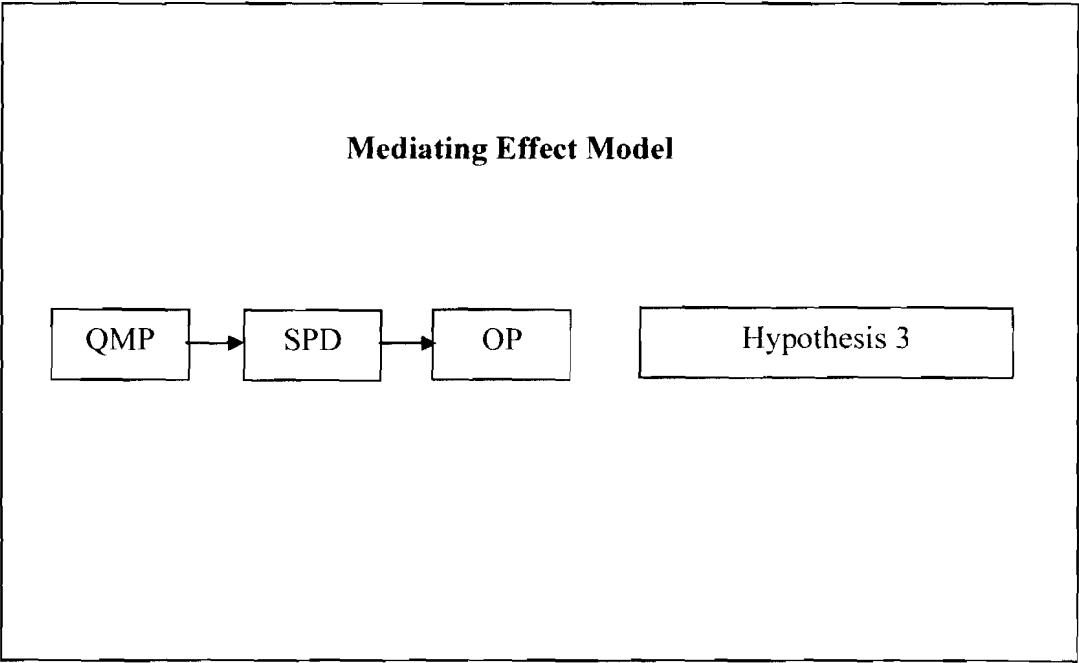


Figure 3.3:
Breakdown model of quality management practices (QMP), sustainable product development (SPD), and organizational performance (OP) –Mediating Effects

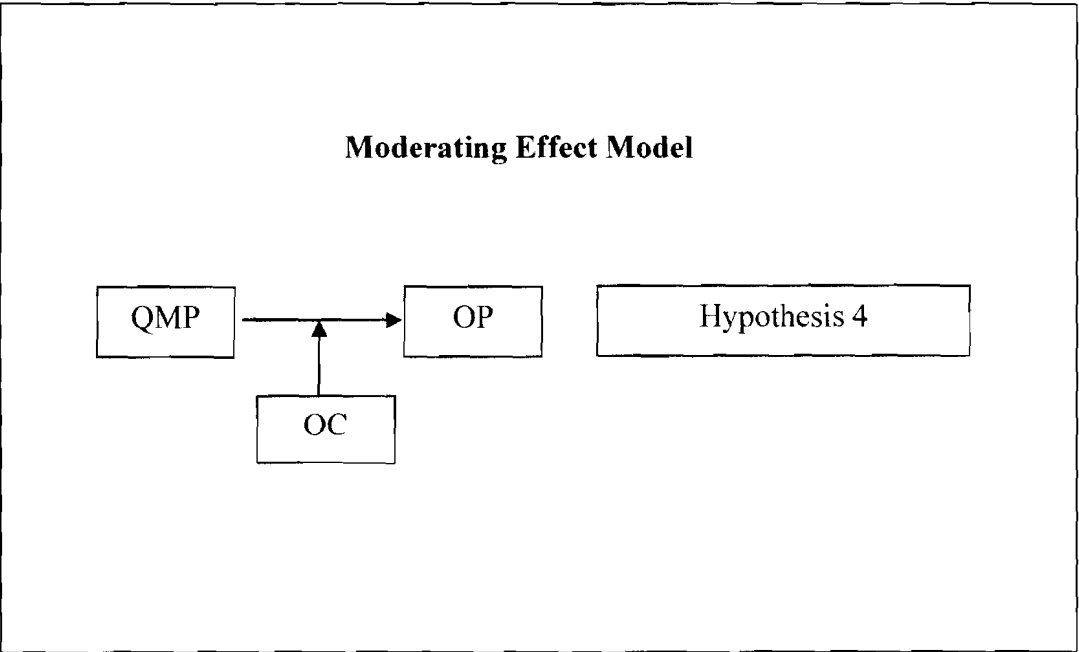


Figure 3.4:
Breakdown model of quality management practices (QMP), organization characteristics (OC), and organizational performance (OP) – Moderating Effects.

3.5.1 The Relationship and Effect of QMP on OP.

The ultimate purpose of quality management practices is improving firms' competitive advantage (Su *et al.*, 2008). In early research, some of the quality management practices are claimed to be key success factors that can achieve business performance, based on quality guru practices, including Crosby's 14 steps for excellent quality outcome (Crosby, 1979), Juran's trilogy of managerial processes (Juran & Gryna, 1980), and Deming's 14 points (Deming, 1986). However, these claims are seldom accompanied by rigorous supporting evidence (Su *et al.*, 2008), especially in the automotive industry.

Quality management concepts have been studied and explored by many authors, including the benefits to an organization for its survival. It began since the Tenth century with the pioneering works of Ibn Al Haytham (as cited in Morgan & Hamilton, 2007), and then the works of Shewhart during the 1920s and 1930s. Since then, the subject area has been better conceptualized in theory, and quality management widely adopted as a standard practice.

There is agreement that quality is a critical success factor for competitiveness in the business world (Tatikonda & Tatikonda, 1996). Empirical studies on quality management in recent years have been in the areas of hypothesis generation and testing (Black & Porter, 1996; Ahire *et al.*, 1996). These research are typically been confined to quality management practices in manufacturing firms.

Therefore, the researcher intends to determine the relationships between quality management practices and organizational performance.

Thus, the hypotheses have been developed for the construct:

Hypothesis 1:

There QM practices have positive relationship with organizational performance.

Hypothesis 2:

There is an effect of QM practices on organizational performance.

3.5.1.1 The Relationship and Effect the Leadership of QMP on OP.

Leadership is an issue that always appears in the literature on quality management and become an important issue in the organization (Deming, 1982; Dale, 1999; Hackman & Wageman, 1995). In relation leadership issues, most of organizations have spent many years debating over the role leadership responsibility. Oakland (2000) argue that leadership professionally must expand the application of quality concept and techniques to all business process and functions and states a series of functions that should be carried out by the quality manager. In spite of the importance given to the role of leadership, however, it little attention has been given to the issues from the empirical perspectives (Moriones & Cerio, 2002). This study will determine the role of leadership of QMP.

Hypothesis 1-1:

There is a positive relationship between leadership of QM practices and organizational performance.

Hypothesis 2-1:

There is effect the leadership of QM practices on organizational performance.

3.5.1.2 The Relationship and Effect the Human Resources of QMP on OP.

In an attempt to gain competitive advantage through quality enhancement strategies, the main key is human resources management in the organization. This is supported by Gerald (1991), who stated that the organization human resources plans should be integrated with its quality and performance goals. He claimed that employees should receive both quality and job-specific training, and be empowered to use that training.

Deros *et al.* (2006) noted that human resources management is one of the critical success factors in benchmarking practices, which will help drive improvements in business and management processes. Similarly, Sanchez-Rodriguez *et al.* (2006) mentioned that management of people was significantly and positively related to purchasing operations performance. Following these findings among authors, the impact of human resources management on quality management practices is argued to be critical. Thus, the following hypothesis is developed.

Hypothesis 1-2:

There is a positive relationship between human resources of QM practices and organizational performance.

Hypothesis 2-2:

There is effect the human resources of QM practices on organizational performance.

3.5.1.3 The Relationship and Effect the Supplier Management of QMP on OP.

The supplier relationship is a very important task for manufacturers as it can contribute to both the competitiveness and profitability of the company. For example, an automobile consists of approximately 15,000 components, only a few of which companies choose to produce in-house (Cusumano & Takeishi, 1991).

On the other hand, manufacturers have limited resources, and great efforts in managing critical parts that have relative importance to their final product (Krause & Ellram, 1998; Dobler & Burt, 1996). Therefore, it is very important to determine what parts to purchase from which suppliers. Selection of suppliers has become a critical task for manufacturers, where early selection of suppliers in new product development can enhance the product and process design (Ragatz *et al.*, 1997).

Traditionally, three measures have been used for determining supplier performance: price, delivery, and quality (Smith *et al.*, 1963). However,

research by Wilson (1994) in the US showed other factors are now becoming important such as quality, service, price, and delivery. According to the findings, then, the following hypothesis is developed.

Hypothesis 1-3:

There is a positive relationship between supplier management of QM practices and organizational performance.

Hypothesis 2-3:

There is effect the supplier management of QM practices on organizational performance.

3.5.1.4 The Relationship and Effect the Customer Focus of QMP on OP.

To satisfy customers is a very important task for every person in an organization, where satisfying customers will result in greater customer retention and market penetration (Rao *et al.*, 1996; Allred, 2001).

Zairi (1994) considered measuring customer satisfaction as the cornerstone of quality management practices. An emphasis on customer satisfaction is considered by many gurus as a major success in quality management efforts (Deming, 1986; Crosby, 1984; Oakland & Porter, 1994; Rao *et al.*, 1996; Spring *et al.*, 1998; Oakland, 2000; Kanji, 1998; Zairi, 1999, 2000; Winser & Corney, 2001; Li *et al.*, 2001; Nakata, 2002; Hitchcock & Willard, 2002). Thus, the following hypothesis was developed.

Hypothesis 1-4:

There is a positive relationship between customer focus of QM practices and organizational performance.

Hypothesis 2-4:

There is effect the customer focus of QM practices on organizational performance.

3.5.1.5 The Relationship and Effect the Process Approach of QMP on OP.

In industrial practice, a process can be defined as a flow of sequence to make the quality product and keep repeating these activities over the time, where the main objective of this process approach is to create valued added to customer (Bergman & Kelfsjo, 2003). Similarly, the obejective of the process in organization is to deliver quality product to end user (Johansson, 2008).

According to Grant *et al.* (1994), the primary goal of the process approach is to meet customer requirements, which is done by improving the quality of products and processes. Srinidhi (1998) has explained deeply that the managing process includes management within the process, reducing or eliminating some activities, assignment of activities to the employees, and at the same time managing the sequence of activities. Thus, it is clear that the automotive industry fits the pattern in the overall industry because its products, process architecture and standards are stable (Xia & Tang, 2011). Furthermore, the following hypothesis is then developed.

Hypothesis 1-5:

There is a positive relationship between process approach of QM practices and organizational performance.

Hypothesis 2-5:

There is effect the process approach of QM practices on organizational performance.

3.5.1.6 The Relationship and Effect the Product Design of QMP on OP.

Ishioka and Yasuda (2009) argued that design of products is creating products that always deliver functional benefits, such as product performance and functions, where all these functional benefits will create market competitiveness.

However, Norman (2002) has argued that product design is not an easy task, where designers must consider (1) manufacturing concerned with production costs and economical products (2) purchasing will look at pricing and prestige values (3) end users will be concerned with usability and functionality (4) maintenance will focus on products that are easily maintained. With all these trends like globalization, customer focus has changed the landscape in the automotive industry where new product developments have the attention of industry. Thus, the following hypothesis is developed.

Hypothesis 1-6:

There is a positive relationship between product design of QM practices and organizational performance.

Hypothesis 2-6:

There is effect the product design of QM practices on organizational performance.

3.5.1.7 The Relationship and Effect the Strategy Planning of QMP on OP.

One of critical aspects in the organization is the strategy planning. According to Curkovic *et al.* (2000) argued that there is indeed strong relationship between strategic planning and TQM with environmental friendly organization. It was supported by Feng *et al.* (2006) claimed that there is significant impact on strategic planning in TQM practices with organizational performance. This study will examine the role of strategy planning in the organization. Therefore the following hypothesis was developed.

Hypothesis 1-7:

There is a positive relationship between strategy planning of QM practices and organizational performance.

Hypothesis 2-7:

There is effect the strategy planning of QM practices on organizational performance.

3.5.1.8 The Relationship and Effect the Information Analysis of QMP on OP.

According to Mendez (1999) organization need information analysis and performance measures based on three reasons; (1) lead entire organization in a particular direction, (2) manage the resources needed to correct direction by evaluating effective actions plan, (3) operate processes and continuously improve. This view was similarly study by Tan and Hamzah (2011) was claimed that information is always required for right decision to be made or an appropriate action to be taken after obtained analysis of data. Prajogo and Brown (2006) examines that the significant impact of quality information and analysis of quality management practices on the quality performance. Therefore, this study will examine the relationship of information analysis and organizational performance, were following hypothesis was developed.

Hypothesis 1-8:

There is a positive relationship between information analysis of QM practices and organizational performance.

Hypothesis 2-8:

There is effect the information analysis of QM practices on organizational performance.

3.5.1.9 The Relationship and Effect the Continuous Improvement of QMP on OP.

Deming (1986) has defined continuous improvement as a process of better quality and less variation which result from process management practices that bring forth incremental improvements and innovation in process, products, and services. Similarly, Bergman and Klefsjo (2003) claimed that continuous improvement is small gradual improvements and symbol for continuous improvement is the plan-do-study-learn cycle. According to Garvin (1988) a concept of continuous improvement is receiving a great attention due to inherent of global competition. Meanwhile, Deming (1986) mentioned that continuous improvement is also implied chain reaction, which links higher quality and lower cost and improve market share.

In automotive industry, the continuous improvement program is rapidly increasing, and organizations need to learn how to enable and develop a strategic continuous improvement capability and meet customers' satisfaction. In order for an organizational to achieve these goals, implementation and use of continuous improvement is essential (Kaye & Anderson, 1999). Therefore, this study will investigate the relationship of continuous improvement in quality management practices. The following hypothesis was developed.

Hypothesis 1-9:

There is a positive relationship between continuous improvement of QM practices and organizational performance.

Hypothesis 2-9:

There is effect the continuous improvement of QM practices on organizational performance.

3.5.2 The Mediating Role of Sustainable Product Development in influencing QMP on OP.

New product development is one of the major responsibilities for any organization that develops products and processes, where both concepts are interrelated, and have great influence over each other in terms of environmental impact (Sroufe *et al.*, 2000). Product development is one of the most critical aspects for an organization in reaching their objectives in sustainability. For this reason, new product development should be considered at the design development stage if possible to minimize cost by reducing the use of materials, energy and resources, while eliminating the use of hazardous material (May & Helvacı, 2010).

As a result, countries and societies pay closer attention to improving environmental products as one of the objectives for organizational achievements (May & Helvacı, 2010). Yet, the notion of sustainable development has been established in organizations in order to redefine their social and environmental responsibilities (Hart, 1997; Stanwick & Stanwick, 1998; Nash, 2000). The following statement are support sustainable product development in term of economical, environmental, and societal.

3.5.2.1 Economic of Sustainable Product Development

The goal of economic development policy is to improved living standards throughout the world and provides goods of products or services to an expanding population (Harris, 2000). Furthermore, he also elaborated that economically sustainable system is able to produce the goods and services on continual basis and maintain manageable balance. In the automotive industry is facing a huge future challenge to reduce the economic impact from cars. When the world commission on environment and development presented their 1987 report, our common future, they sought to address the problem of conflicts between environment and development goals by formulating a definition of sustainable development. Is there an extensive discussion and use of the concept since then, there has generally been a recognition of three aspects of sustainable development (Holmberg, 1992). Amongst the important aspect is economical concern of sustainable product development.

Lovins and Cramer (2004) therefore argue that the automotive industry has failed to renew the technological base on which new cars are developed and produced, especially within the areas of economical performance of the cars.

3.5.2.2 Environment of Sustainable Product Development

Many companies have concern about environmental of products and how becoming as an integral part in their corporate cultures and management process (Berry & Rondinelli, 1998). As result, many organizations seek

alternative products and application that are less polluting and alternative materials, energy sources, or processing method that eliminate waste (Berry & Rondinelli, 1998). However, they claimed that organization applies total quality management (TQM) principles or quality management practices effectively have fewer problems with environmental compliance.

3.5.2.3 Society of Sustainable Product Development

Social is one of element in sustainable product development. According to Ballet *et al.* (2003) social in sustainable product development have emphasized the guarantees for present and future generations of human well-being. Furthermore, Coenen *et al.* (2000) claimed that social quality is stressed on objective and subjective aspects of society which involve directly to them. As result, there is resurgence of interest in social dimension in product development after Johannesburg summit declaration in 2002 (Jollivet, 2003).

Therefore, as above reason of sustainable product development in term of economic, environment and social of product development in this study will investigate the mediating effect in the relationship between QM practices and organizational performance. The following hypothesis was developed.

Hypothesis 3:

Sustainable product development is mediate variable that influence of QM practices on organizational performance.

3.5.3 The Moderating Role of Organization Characteristics in influencing QMP on OP.

In general, it is believe that quality management practices would be success if implementation of the program that take consideration in long term planning, among the criteria required are organization characteristics. In this study, the organization characteristics cover the scope of size of firms that consists of number of workers and sales turnover, ownerships of firm, and length of time quality management adoption. The following statements explain in detail the related hypotheses development use in this study.

3.5.3.1 Size of Firms

Studies dealing with the issues of the firm's size have some conflicting conclusions. Study from Benson *et al.* (1991) is failed to find any relationship between company size and quality management practices implementation. It was supported by Ahire *et al.* (1996) observed that there are no operational differences in quality management practices implementation owing to company size, with the exception of customer focus and statistical product control usage.

However, in contrast, Powell (1995) finds that company size does have impact an organization performance. Ahire *et al.* (1996) argue that large firms implement any form of quality management program execution quality management constructs more rigorously and better product quality than those that do not. According to Brah *et al.* (2002) size of firms and the adoption of quality management practices are two factors that correlate significantly with

a more rigorous quality management implementation and a higher level of quality performance.

3.5.3.2 Ownership of firms

A number of previous studies have been published that directly examine the relationship between organizational characteristics such as ownership, size of firms. Choong and Rundus (2004) claimed that almost all studies considered organizational characteristics as moderating variable. Yavas and Rezayat (2003); Hui *et al.* (2004) found that there have influenced of organizational culture or behavior and type of corporate ownership. Therefore, management needs to understand on various factors on how quality management practices could be implemented effectively in their organization especially on ownership of firms. Pun (2001) found no evidence that culture influenced employee involvement of quality management practices in Chinese owned companies. It is also important to link cultural values (influenced by ownership) to quality management practices and organizational performance (Hoang *et al.*, 2010).

3.5.3.3 Length of time QM Adoption

Many studies had investigated the quality management practices are provide an approach to improve economic position of the organization in manufacturing and service. Especially in manufacturing company could be achieved world class status when it has successfully developed operational

capabilities throughout quality management (Arawati, 2008). However, quality management practices would only successfully implemented in an organization if they are committed to a long life learning process of continuous improvement (Arawati, 2005).

Several studies have suggested that the length of time QM adoption has an important relationship with performance (Powell, 1995; Terziovski & Samson, 1999; Dow *et al.*, 1990; Arawati & Za'faran, 2000). However, none has empirically investigated length of time QM adoption would enhancing organizational performances in Malaysian manufacturing companies (Arawati, 2005) especially in Malaysian automotive industry.

Therefore, as above reason of organization characteristics in scope of size of firms, ownerships of firms, and length of time quality management practices adoption. This study will investigate the moderating role of organization characteristics.

Hypothesis 4:

Organization characteristics are moderate influencing of QM practices on organizational performance.

3.6 Control Variables

Control variables in research are discussed is to minimize the error and to enhance the statistical measurement. Control variables are need to kept constant, neutralized in relationship between two other variables (Russo & Fouts, 1997). In

this study, organizational performance was a dependent variable, quality management practices as independent variable that all controls variables are chosen from previous research have relationship on organizational performance. Consequently, sustainable product development was a mediating variable and organization characteristics as moderating variable.

3.7 Summary of Hypotheses Development

In Table 3.2 was illustrated the summary of research hypotheses. This is compiling from hypothesis H1 and corollary hypotheses consist of H1-1 to H1-9, H2-1 to H2-9, H2, H3 and hypothesis H4.

Table 3.2
Summary of Research Hypothesis

Hypothesis	Statement of Hypothesis
H1	QMP are positive relationship with OP.
H1-1	Leadership of QMP is positive relationship with OP.
H1-2	Human resources management of QMP is positive relationship with OP.
H1-3	Supplier management of QMP is positive relationship with OP.
H1-4	Customer focus in QMP is positive relationship with OP.
H1-5	The process approach of QMP is positive relationship with OP.
H1-6	Product design of QMP is positive relationship with OP.
H1-7	Strategy planning of QMP is positive relationship with OP.
H1-8	Information analysis of QMP is positive relationship with OP.
H1-9	Continuous improvement of QMP is positive relationship with OP.

Table 3.2 (Continued)
Summary of Research Hypothesis

Hypothesis	Statement of Hypothesis
H2	QMP is effect on OP.
H2-1	Leadership of QMP is effect on OP.
H2-2	Human resources management of QMP is effect on OP.
H2-3	Supplier management of QMP is effect on OP.
H2-4	Customer focus in QMP is effect on OP.
H2-5	The process approach of QMP is effect on OP.
H2-6	Product Design of QMP is effect on OP.
H2-7	Strategy planning of QMP is effect on OP.
H2-8	Information analysis of QMP is effect on OP.
H2-9	Continuous improvement of QMP is effect on OP.
H3	SPD is mediated influencing of QMP on OP.
H4	An organization characteristic is moderated influencing of QMP on OP.

3.8 Summary

This chapter has explained the details of theoretical used in this study. These theories are namely; resources based view theory, institutional theory, and stakeholder theory. This chapter also discussed the conceptual of framework and development of research hypotheses. There are four hypotheses in this research; first hypothesis is to examine the relationship between quality management practices and organizational performance, second hypothesis is to examine the effects of quality management practices on organizational performance. Third hypothesis is to investigate the effect of sustainable product development in

relationship between quality management practices and organizational performance and last hypothesis is to investigate the effect of organization characteristics in relationship between quality management practices and organizational performance.

The next chapter will discuss the research methodology. In this chapter will elaborate the concept of research design, population of study, sampling method, measurement variables, construction of questionnaire, measure scale, statistical analysis techniques and their finding results.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Introduction

In this chapter will discuss the methodology of research in detail, explain the research design, research sampling, research activities, measurement of variables, questionnaire development, scale of measurement, pretesting of the questionnaire before they are sent to respondents, the statistical analysis techniques and summary.

4.2 Research design

Research design is a framework which gives guidelines to researcher on how to collect the data and how to make statistical data analysis for answering the hypotheses in this study. Zikmund (2000) described research design as a master plan specifying the techniques and procedures for collecting and analyzing the needed information, and such is considered important in any research. Similarly, Wiersma (1995) explained that there are several advantage of quantitative research method, whereas free from confounding, bias and statistical analyses are used to determine and validate the research hypotheses. Peers (1996) stated that generally, survey design is to try to minimize error. The impact of having procedures of research design cannot be denied, as found by many researchers. The following section discusses types of research design.

4.2.1 Types of Research Design.

Hair *et al.* (2010) highlighted four main types of research design: (1) exploratory; (2) descriptive; (3) hypothesis testing; and (4) case study analysis. Meanwhile, Sproul (1995) defined descriptive research design as having lower control over the variable and subject of the study as compared to exploratory research design, so that the researcher can control the measures of the study. Hypothesis testing is engaged to explain the nature of certain relationships and case study research design is involved in in-depth, contextual analyses of matters relating to similar situations in other organizations (Zikmund *et al.* 2010).

One of the purposes of this study is to measure the mediating variable of sustainable product development that influencing the quality management practices on organizational performance in the Malaysian automotive industry. Based on the above discussion, it is clear that this study will use hypothesis testing in its research design.

4.2.2 The Quantitative Design

Quantitative design study is defined as analyzing data or information that is descriptive in nature, and not readily quantifiable (Sekaran, 2003 pg. 422). And according to Marcyk, DeMatteo, and Festinger (2005), quantitative research involves use of statistical analysis to obtain the findings. Meanwhile, Gay *et al.*, (2009) stated that a good sample in quantitative research is one that represents the population from which it was selected, and selecting a representative sample is not a haphazard process.

In this study, the researcher will use quantitative design to distribute the questionnaires because quantitative design approach is considered suitable for exploratory study since it much relies on literature review.

4.3 Population of the Study

Population in this study refers to all automotive components manufacturer that sell the products to main automotive in Malaysia such as Proton, Perodua, Modenas, Honda, Suzuki, Naza. The respondents to answer the question are selected from executive or manager in quality management department or any top management department that directly involved in any important company decisions making group.

A total 275 companies are involved in automotive components supplier to main supplier in Malaysia (Aziz, 2012). The complete automotive components supplier address was obtained from each purchasing department of main supplier. The comprehensive checking was done to ensure there are no redundant of supplier address while distributed the questionnaire to them.

The unit of analysis of this study is organization that actively supplier an automotive part or components to main supplier in Malaysia. Respondents to answer the questions are an expert is directly involved with quality management practices decision in the organization.

4.4 Sampling Method

In this section, researcher will use simple random sampling method where according to Gay *et al.* (2009, p. 125) simple random sampling is the process of selecting a sample in such a way that all individuals in the defined population

have an equal and independent chance of selection for the sample. The advantage of simple random sampling method is no bias while select the respondents compare to other method (Salkind, 2003). These methods also have generalizability (Cavana *et al.*, 2001). Sample random sampling method can be done by using Microsoft Office Excel 2003 in selecting the supplier list as given by main automotive industry such as Proton, Perodua, Modenas, Honda, Suzuki, Naza.

In choosing the Microsoft office excel 2003 of sample random program, the first step is to developed the row and column in excel sheet. Each column is appointed the company name and number, then the next empty column is need to key in “= rand ()” as excel program formula to get the random value. Cut and paste the value of random in each row with company name and number, with sorting the value of random from lowest to highest, the mircosoft office excel will automatically provide the sample random sampling figure.

4.4.1 Sample Size

According to Hair *et al.* (2010) sampling is a “process of selecting a sufficient number of elements from the population, so that a study of the sample and an understanding of its properties or characteristics would make it possible for us to generalize such properties or characteristics to the population elements”. In addition, she added that a sample is subset of the population. Stevens (1996, p. 72) recommends that “for social science research, about 15 participants per predictor are needed for a reliable equation.

According to Barlett, Kotrlik, and Higgins (2001), on foundations of sample size determination, it should consider the type of Likert scale that will be used, e.g., a seven-point Likert scale or a five-point Likert scale. Cochran (1977) addressed this issue by stating that “one method of determining sample size is to specify the margin of error for the items that are regarded as most vital to the survey. An estimation of the sample size needed is first made separately for each of these important items” (p. 81).

Barlett *et al.* (2001) and Krejcie and Morgan (1970) stated that for a population between 200 to 300 respondents, the sample size should be between 75 to 85 respondents, where continuous data with alpha is 0.05, and an accepted margin of error of 3%. This also supported by Tabachnik and Fidell (2007), where $N > 50 + 8m$ ($m = 5$), which equaled 90 respondents. In this study the simple random sampling technique will be used and participants will be selected for distribution of the questionnaires. In the next section the researcher discusses the data analysis for each variable in the research framework.

4.5 Respondents

The respondents in this study are chief executive officer, general manager, managers, engineers and executive those are officials holding the managerial positions of the firms. There are respondents responsible for the implementation of quality management practices, sustainable product development in their organizations. These respondents have directly involved the organization

strategic planning decisions that consider validity and reliable resource of organizational information (Sin *et al.*, 2001).

The primary objective of this study is investigating quality management practices with organizational performance. The quality management practices as they are related to nine components that constitute leadership, human resources management, supplier management, customer focus, process approach, design of products, strategy planning, information analysis, and continuous improvement.

Besides, the study also intended to examine the mediating effect of sustainable product development in between quality management practices and organizational performance. Meanwhile, finally this study also to examine the moderating effect of organization characteristics of quality management practices on organizational performance. As reason, this study is suitable for the assessment of CEOs, owner-managers, general managers, managers, engineers and executive those are officials holding the managerial positions in each firm.

4.6 Measurement of Variables

Zikmund *et al.* (2010) defined the measurement of variables or operation definitions as process of identifying scales that involve in research process. In other words, measurement of variables or operational definitions explained in details of how researcher will measure the variable that available in framework in more scrutinized way.

Operationalization of the variables was constructed based on exhaustive literature reviewed that they have been developed and tested scales. The design

of questionnaire is based on previous literature with valid scales for further data analysis. Next sections explain detail elaborations.

4.6.1 Quality Management Practices

The purpose of implementation quality management practices is to improve organization competitive advantages (Su *et al.*, 2008). According to quality gurus such as Crosby (1979); Deming (1986) emphasize that quality practices are keys success factors for organization performance. It was support empirical study by Flynn *et al.* (1994); Black and Porter (1996); Ahire *et al.* (1996) stressed that quality management practices have significant have positive relationship with organizational performance. In this study researcher are adapted the definitions of quality management practices from Bergman and Klefsjo (2003) were defined as the practices of managing quality of product.

In this study, quality management practices variables are namely, leadership, human resources management, supplier management, customer focus, process approach, design of products, strategy planning, information analysis, and continuous improvement.

4.6.1.1 Leadership

Leadership is the most important element in quality management practices. It provides guidance to implement quality activities that create lots of benefit to the organizational performance. Oakland (2000) argued that leadership must professionally expand the application of quality practices to all business process and function in organization. Studied by Deming (1982);

Dale (1999); Hackman and Wageman (1995) found that leadership issues always appears on quality management practices and become main agenda in organization structure. In this study the leadership is defined as the ability to positively influence people and systems under one's authority to have a meaningful impact and achieve important result (Evans & Lindsay, 2005, p.204).

4.6.1.2 Human Resources Management

Gerald (1991) claimed that human resources management must integrated with quality practices and performance goals. It emphasize the scope of receive quality training, job specific training. It defined as an objective of effective human resources management system are to build a high performance workplace and maintain an environment for quality excellence to enable employees and the organization to achieve strategic objectives and adapt to change (Evans & Lindsay, 2005, p. 256).

4.6.1.3 Supplier Management

Supplier management relationship is very important for main manufacturers. It quality performance can contribute to company growth and sustainability. Ragatz *et al.* (1997) argued that the selection of suppliers has become critical task for organization at early selection of supplier. In this study it defines as working with suppliers in a partnering atmosphere to achieve the same quality level as attained within the organization (Besterfield *et al.*, 2003).

4.6.1.4 Customer Focus

Zairi (1994) considered measuring customer satisfaction as the cornerstone of quality management practices. According to Rao *et al.* (1996); Allred (2001) satisfy customer is a very important task for every person in an organization that resulted customer retention and market penetration. It defines as meeting the needs and requirement of customer.

4.6.1.5 Process Approach

Johansson (2008) argued that aim of process approach is to deliver products that satisfy the customer. Meanwhile, in this study it defines that process approach as a network of activities that use of resources, enables repeated conversion of an input into output for stake holders (Isaksson, 2004).

4.6.1.6 Design of Products

Design of products is creative process in which products are conceptualized and specified, which plays a vital role in enabling organization to successfully exploit their innovative research (Langdon & Rothwell, 1985). On the other hand, Walsh (1996); Bruce and Copper (1997) claimed that design of products involves creative concepts, plans, and ideas which are represented through the use of sketches, and it aimed at providing something does not exist. In this study it defines as translates customer expectations for functional requirements into specific engineering and quality characteristics.

4.6.1.7 Strategic Planning

Quinn (2000) claimed that strategic planning can be defined as plans are integrates an organizational major goals, policies, and action sequences into a cohesive as a whole. It demands the integration of quality and customer satisfaction into strategic and operational plans.

4.6.1.8 Information Analysis

Key part of the information analysis is keep staff informed a desirable organizational objective and a useful management methodology (Bergman & Klefsjo, 2003). It defined as continuous flow of accurate information about processes that generate a company's products from various constituencies like workers, agents, vendors and customers (Crosby, 1979; Deming, 1986; Ishikawa, 1985; Juran, 1986).

4.6.1.9 Continuous Improvement

Marin-Garcia *et al.* (2008) stressed that continuous improvement is an important strategic tool to increase competitiveness in organization. Meanwhile, Imai (1986) defined the continuous improvement as ongoing improvement involving everyone in the organization.

4.6.2 Sustainable Product Development

Fundamental of sustainable product development it created from Bruntland report (WCED, 1987) whereas defined as "development that meets the needs of the present generation, without compromising the ability of future generations to meet their own needs". On the other hand, Zairi and

Liburd (2001) stressed that sustainable development can be achieved when organization adapt to change in business environment to capture contemporary best practice methods and to achieve superior competitive performance. In this study the sustainable product development it defined as development of products which are consists of three elements of environmental, economical, and societal in their products development (Hemmings *et al.*, 2004).

4.6.3 Organizational Performance

Organizational performance is an important factors that to measure an effective management. In general, organizational performance is defined as the extent to which operations achieves performance goals (Slack *et al.*, 2001). In this study the organizational performance are measured by financial and non-financial dimensions.

4.6.4 Organization Characteristics

In general the organization characteristics would be influenced the success of some implementation in organization. Gagnon and Toulouse (1996) studied that the size of organization has significant relationship with effectiveness of quality management practices adoption, while others authors such as Ahire *et al.* (1996), Swamidass and Kotha (1998) claimed that organization characteristics that related to ownership of organization have significant influenced towards the implementation of quality management practices. In this study the organization characteristics known as size of firms, ownership of firms, and length of time quality management adoption have

significant relationship with quality management practices, sustainable product development, and organizational performance.

4.7 Questionnaire Development

According to Gay *et al.* (2009) the questionnaire development should be attractive, brief, and easy to understand by respondents. The researchers are needed to consider the type of format and questionnaire content that study elements are fully understood that required respondents to respond. Most commonly used is survey method. As claimed by de Vaus (1986) that questionnaire method most widely used in survey research method. Thus the researcher adopts the questionnaire method are used to obtained the data in this research. The questionnaire was printed as a booklet with in each section is separated properly to make it more presentable and interesting.

4.7.1 Structure of the Questionnaire

Gay *et al.* (2009) claimed that few of elements need to be consider during structure of the questionnaires such as include only items that related to the objectives of the study, collect demographic information, focus each question on a single concept, define ambiguous terms, include a point of reference to guide respondents in answering questions, avoid leading questions, avoid sensitive questions, and not ask questions that assumes a fact not necessarily true.

In this study, the structure of the questionnaire was developed and divided into four main parts. The first part is to obtain perception information of

quality management practices. This includes leadership, human resources management, supplier management, customer focus, process approach, design of products, strategic planning, information analysis, and continuous improvement. The second part of the questionnaire is designed to gather the perception of sustainable product development. This includes environmental, economical, and societal of product development. The third part forms the perception of organizational performance that includes with financial and non-financial performance. The last part of the research questionnaire is to obtain respondents demographic which includes personal demographic and organizational demographic. Table 4.1 illustrated the summary of questionnaire structure.

Table 4.1
Summary of the Questionnaire Structure

Part	Section	Contents
1	A	<i>Quality Management Practices</i> Leadership Human Resources Management Supplier Management Customer Focus Process Approach Design of Products Strategic Planning Information Analysis Continuous Improvement
2	B	<i>Sustainable Product Development</i> Economic Environment Society
3	C	<i>Organizational Performance</i> Financial Performance Non-Financial Performance
4	D	<i>Demographic</i> Personal Demographic Organization Demographic

The researcher used various type of scale in the questionnaire. In the first, second, third part of the questionnaire the researcher used six-point

Likert scale which designed to examine how strongly the respondents as a high or as a low agreement of the statement (Cavana *et al.*, 2001). In part four of the questionnaire the researcher used the categorical and continuous scale to measure respondent in demographic section.

The several steps were taken to ensure the structuring of questionnaire is meet the objective of research topics, among step were taken is a comprehensive literature review was done in previous author studies in related to the topic. Intensive word to word translation was carried out to prevent any misunderstanding of the developed questions. Expert opinion from academic in related fields and advise from automotive professionals person who directly in charge the company decision in quality matters. The questionnaires were administrated to the respondents through phone call, email, re-email, factory visit and attend vendors' conference. A self-administrated questionnaires method was taken to increase the respond rate.

In next section discussed the development and construction of questionnaires. Which are including the quality management practices, sustainable product development, organization characteristics and organizational performance.

4.7.2 Quality Management Practices of Dimensions and Items

This section is to determine the core constructs of dimensions and items of quality management practices in automotive industry. Quality management practices, which are an indispensable part of organization strategy that needed

giving full attention for globalization and competitive market (Rahman, 2003). By implementing quality management practices it be positive result to business performance in term of cost reduction and increased profit (Gaspersz, 2005). Riyadi and Munizu (2013) claimed that to be competitive in market, the organization should be able to compete by creating the condition that would them enable meet the local and international markets.

Garvin (1988) stressed that quality dimensions can be identified namely the conformance, reliability, features, performance, aesthetics, durability, perceived quality and serviceability. Consequently, Ahire *et al.* (1996) argued that quality management of critical factors are namely top management commitment, employee training, design quality, supplier management, internal quality information, employee involvement, employee empowerment, customer focus, benchmarking, statistical process control (SPC) usage, product quality, and supplier performance. In addition, Saraph *et al.* (1989) emphasized eight critical success factors of quality management which are known as role of top management, quality data and reporting, employee relations, training, product design, role of quality department, supplier quality management and process management.

However, developed critical success factors are not applicable to all industries to suit with same dimensions, especially in automotive industry. Many authors in automotive industry studies have developed the critical success factors to match with their industries such as Ahire and O'Shaughnessy (1998) claimed that quality dimensions in automotive which

are customer focus, supplier quality management, and employee empowerment. Isac (2004) studies in Romania automotive industry stressed that quality management dimensions are known as customer focus, continuous improvement, employees empowerment, use of quality tools, product design, and supplier quality management. Meanwhile, in study by Jirapattarasilp (2011) in Thailand automotive industry, the quality dimensions construct which are namely, quality management policy, quality management method, top management involvement, quality activity, used of quality tools, human resources management, team working, data collection, quality process, cost control, and product development. Nine dimensions of quality management practices were selected in this study. These dimensions are leadership, human resources management, supplier management, customer focus, process approach, products design, strategic planning, information analysis, and continuous improvement. Furthermore, these nine dimensions are covered all an organization integrated aspects such as internal and external process. Table 4.2 illustrated the sources and number of items related to quality management practices.

Table 4.2

Dimensions Related to the Quality Management Practices

I.V	Dimensions	No. of Items	Source of Items
Quality Management Practices	Leadership	6	Saraph <i>et al.</i> (1989), Flynn <i>et al.</i> (1995), Zhang (2000); Kalra and Pant (2013); Ramesh (2012)
	Human Resources	5	Mady (2009), Merino Diaz (2003), Flynn and Saladin (2001).
	Supplier Management	6	Takeishi (1990), Merino Diaz (2003), Anderson and Sohal (1999), Ahire <i>et al.</i> (1996)
	Customer Focus	5	Flynn and Saladin (2001), Sani Sanuri (2007), Kartha (2004), Merino Diaz (2003), Mady (2009), Zu (2009).
	Process Approach	5	Saraph <i>et al.</i> (1989), Merino Diaz (2003), Sani Sanuri (2007)
	Design of Products	5	Ahire <i>et al.</i> (1996), Merino Diaz (2003), Sani Sanuri (2007), Gonzalez - Benito (2001).
	Strategic Planning	5	Lee and Quazi (2001), Powell (1995).
	Information Analysis	5	Miyagawa and Yoshida (2005), Joseph <i>et al.</i> (1999), Anderson and Sohal (1999)
	Continuous Improvement	5	Das <i>et al.</i> (2011), Ahire <i>et al.</i> (1996), Saraph <i>et al.</i> (1989)

Furthermore, Table 4.3 illustrated the items used in construct questionnaire of leadership, human resources management, supplier management, customer focus, process approach, design of products, strategic planning, information analysis, and continuous improvement.

Table 4.3
Dimensions and Items of Quality Management Practices

Dimensions	Items
Leadership	Company leaders actively participate in quality improvement process.
	Company leaders strongly encourage employee involvement in quality improvement.
	Company leaders empower employees to solve quality problem.
	Company leaders provide an adequate employees training on quality.
	Company leaders discuss quality issues in meeting
	Company leaders pursue long term business success
Dimensions	Items
Human Resources	We give authority to employees for inspecting their own work.
	We encourage employees to solve the problem.
	We offer some training to our employees on regular basis.
	We actively select employees who are able to work well in small groups.
	We implement many useful suggestions from employees.
Dimensions	Items
Supplier Management	We have supplier selection criteria (e.g. quality, cost, financial, service, technical, and delivery).
	We have supplier selection criteria in term of sustainable product (e.g. environmental, economical, and societal).
	We monitor supplier's performance
	We recognize suggestions made by supplier
	We emphasize long term supplier relationship.
	We realize the important of quality rather than price.

Table 4.3 (Continued)
Dimensions and Items of Quality Management Practices

Dimensions	Items
Customer Focus	We encourage customer relationship.
	Our business objective is customer satisfaction
	Our customer give us feedback on quality, cost, and delivery
	We measure customer satisfaction (e.g. customer survey) on regular basis.
	Our customer is involved in quality improvement program
Dimensions	Items
Process Approach	We recommend employee for self-inspection program.
	We have preventive maintenance schedule.
	Our program is to reduce waste time in all process. (e.g. 7's waste management).
	We clarify the process ownership.
	We have fool-proof (e.g. poka-yokei) in critical process.
Dimensions	Items
Design of Products	We adopt customer valuable idea in design stage
	We work in teams, with member from other department (e.g. sales, marketing) in product design.
	We consider 3R (re-assembly, re-usability, re-cyclability) in product design.
	We use quality tools such as DFMEA (Design Failure Mode Effect Analysis) in product design.
	Our product design is focusing on reduces waste.
Dimensions	Items
Strategic Planning	We acknowledge company strategic plan to all staff (e.g. company vision, mission and etc.).
	We had written strategy plan in the next 12 months.
	Our action is based on formal plans
	We kept evaluate strategic planning process.
	We have regular meeting to discuss overall strategy

Table 4.3 (Continued)
Dimensions and Items of Quality Management Practices

Dimensions	Items
Information Analysis	We analyze all data (e.g. defect rates, scrap, rework, etc.).
	Our quality data availability is on time
	We share valuable data to all staff in plant (e.g. customer feedback, etc.).
	We monitor CoQ (Cost of Quality) such as preventive cost, appraisal cost, failure cost.
	We use valuable data for decision making (e.g. cp, cpk, etc.).
Dimensions	Items
Continuous Improvement	We use Plan-Do-Check-Action (PDCA) cycle extensively for continuous improvement.
	We have accurate database that provides information on internal process operations (e.g. straight pass data, etc.).
	We use statistical process control (SPC) such as x-bar chart, extensively for continuous improvement.
	Our equipment is well maintained according to plan
	We use quality control tools (e.g. QC 7 tools) for continuous improvement.

4.7.3 Sustainable Product Development Constructs and Dimensions

In section B of the questionnaire designed to obtain the information of sustainable product development that consists of economical, environmental, and societal dimensions. Sustainable product development was inspired by the WCED (1987) definitions of sustainable development that fulfill the wants and expectations of current needs, but also to meet their needs of future generations. Hemming *et al.* (2004) was emphasized the WCED (1987) definition that sustainable product development has evolved in consideration based on triple bottom line which are known as economic, environmental, and societal.

Edgeman and Hensler (2001) claimed that sustainable development agenda is an important for all types of organizations. While, study by Garvare and Johansson (2007) organization sustainability will be achieved if the organization endlessly meets the demands of its stakeholders, without compromising the ability of all effected parties to meets their own needs. This section contains three questions that can describe the influence of sustainable product development. Table 4.4 shows the sources and number of items related to sustainable product development.

Table 4.4
Dimensions Related to the Sustainable Product Development

Mediator	Dimensions	No. of Items	Source of Items
Sustainable Product Development	Economic	5	May and Helvaci (2010), WBCSD (1993).
	Environment	5	Brezet (1994), Keldman and Hemel (1996), Carter and Jennings (2004), Schvaneveldt (2003), Yanagida (1995).
	Society	5	Zhao (2004), Zairi (2000), Schvaneveldt (2003), Yanagida (1995)

Table 4.5 described the items used in construct questionnaire of economic, environment, and society of sustainable product development.

Table 4.5
Dimensions and Items of Sustainable Product Development

Dimensions	Items
Economic	We consume less energy in production process (e.g. water, electricity, etc.).
	We apply an effective user friendly design.
	We take positive steps to improve economics product design.
	We reduce weight of materials in product development.
	We use recycle material wisely into our products
Dimensions	Items
Environment	We use non-hazardous materials on products (e.g. non asbestos, etc.).
	We use environmental friendly material on products (e.g. non-toxic, etc.).
	We use low emissions pollution materials on product
	We reduce waste in product development
Dimensions	Items
Society	We use label on product to create on environmental awareness (e.g. recycle label, material type, etc.).
	We create healthy product for the society (e.g. product with less CO ² gas emission, low noise, etc.).
	We produce the products that have positive environmental impacts to society (e.g. Green technology product, etc.).
	We provide safe working environment to employees.
	We inform timely to society who may effect by conditions of our products (e.g. health, safety, and environment).

4.7.4 Organizational Performance Construct and Dimensions

This dimension of the questionnaire represents the measurement of the dependent variable. It is designed to elicit the information about organizational performance. The measurements used in this study are financial and non-financial dimensions. The questions are adopted from several of authors such as Adam *et al.* (1997), Bontis *et al.* (2001), Agus and Sukri (2012), Forker *et al.* (1996), Sin and Tse (2000), Li (2000), Neely *et al.*

(2001) and etc. Table 4.6 illustrates the sources, dimensions and number of items.

Table 4.6
Dimensions Related to the Organizational Performance

D.V	Dimensions	No. of Items	Source of Items
Organizational Performance	Financial	6	Adam <i>et al.</i> (1997), Bontis <i>et al.</i> (2001), Agus and Sukri (2012), Forker <i>et al.</i> (1996), Sin and Tse (2000), Neely <i>et al.</i> (1996), Li (2000), Anderson and Sohal (1999), Love and Holt (2000).
	Non-Financial	5	Bontis <i>et al.</i> (2001), Caruana and Pit (1997), Pitt <i>et al.</i> (1996), Sani Sanuri (2007), Love and Holt (2000), Buttle (1996), Mohd Khairuddin (2000), Agus and Sukri (2012), Giovanni (2010), Melynk <i>et al.</i> (2003), Pujari <i>et al.</i> (2004), Rao and Holt (2006), Chien and Shih (2007).

Figure 4.7 illustrated the dimensions and items of organizational performance based on financial and non-financial.

Table 4.7
Dimensions and Items of Organizational Performance

Dimensions	Items
Financial	Profit has increased
	Sales growth has increased
	Improve cost reduction
	Return of investment has increased
	Improved cash flow
	Improved in return of asset
Dimensions	Items
Non-Financial	Increased overall business performance
	Improved customer satisfaction
	Increased productivity
	Improved process efficiency
	Improved employments satisfaction
	Increased market share
	Opportunity to gain new market
	Improved product pollution awareness among staff
	Improved products emission issues
	Improved of energy usage in the organization

4.8 Measurement Scale

Likert scales were used in this study to determine the measurement of respondents perceived the questionnaire given. As reason, there is easy to construct, good reliability and adaptability (Babbie, 1990; Nunnaly, 1978). Six-point Likert scale with measurement an indicated the low and high were respondents to choose among the given options.

Generally, six-point Likert scale used in this study is purposely without mid-point of measurement scale. As reason, for undecided items the respondents will tendency to choose mid-point as result of satisfying (Cook, 2005; Krosnick, 1999). Meanwhile, Graland (1991) stressed that rating scale represent in research is to allow respondents to express both direction and strength of their opinion

about topic. Furthermore, Birkett (1986); Komorita and Graham (1965) claimed that six-point Likert scale is more reliable than others. Figure 4.1 illustrated the measurement scale use in the questionnaire.

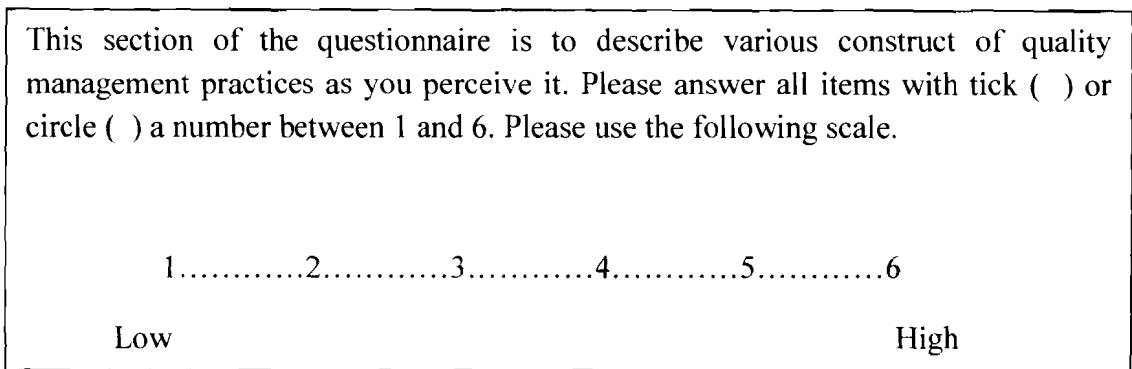


Figure 4.1
Measurement scale use in questionnaire

Figure 4.1 shows the measurement scale of 1 as low level and 6 as high level of the continuous measurement.

4.9 Pretesting the Questionnaire

The aim of pretesting is to validate instruments for next data collection (Aaker *et al.*, 2007). It is to tell how well the research can manage content validity or face validity in content of the scales represents the measures. Among of them is asking the experts opinion on to assess content validity is such, review the content and scales when necessary. Meanwhile it also evident that validate the scale is needed in this study throughout because no such studies on sustainable product development in terms of automotive industry that related to organizational performance.

First step is to conducted literature review for gain insights about background of study variable of quality management practices, sustainable product development, organization characteristics and organizational performance as detail elaborated in the chapter two.

During the second stage, a form of questionnaire that represents the respective dimensions in the study was generated. To strengthen this process, the researcher conducted procedure for multiple-step confirmatory. Firstly, the researcher conducted a face to face appointment with automotive industrial experts and validated the content validity of questionnaires given to them. During the discussion, the researcher explained to them the aim of pretesting and requests their participant. The automotive vendors are selected based on nearest to researcher location and easy to access these firms. Finally, seventeen automotive vendors were selected to participate in this study.

The researcher conducted factory visit and asking them by using structured questionnaire. The researchers and respondents are asking the definition use in the questionnaire whether it was relevant to the subject measures. The researcher evaluate all terms using in questionnaire contents and asked for example word that always use in relevant case in automotive industry to be considered. Subsequently, the researcher also was conducted face validity with field expert academicians. The academicians include two professors and one senior lecturer.

In early February 2013, total 17 pretest data was collected from the respondents after three week distributed to them. Some modifications were made

based on suggestion by respective respondents which included some example in term of frequently use by automotive industry.

Pretest was conducted purposely to identify improvement area in questionnaire design and format. Even though in this study, the total of pretest respondents are 17 organizations. There are some arguments of necessary unit for pretest respondents, However (Zikmund & Babin, 2007; Emory & Cooper, 1991; Lehman *et al.*, 1998) agree the respondents for pretesting should be ranged between 5-100 respondents. Consequently, according to Sekaran (2003) the measurement of Cronbach's alpha coefficients is compulsory in pretesting analysis, because is to determine the reliability of constructs.

Table 4.8
Cronbach's Alpha Coefficient of Pretest Questionnaire (n=17)

Dimensions	Items	Cronbach's Alpha Coefficient
Leadership	6	.927
Human Resources	5	.928
Supplier Management	6	.936
Customer Focus	5	.931
Process Approach	5	.935
Design of Product	5	.928
Strategic Planning	5	.942
Information Analysis	5	.923
Continuous Improvement	5	.926
Economic of SPD	5	.878
Environment of SPD	5	.933
Society of SPD	5	.803
Financial	6	.850
Non-Financial	10	.805

In Table 4.8 revealed the Cronbach's alpha are above (0.70), that mean the internal reliability variables of pretesting are acceptable (Nunnaly, 1978).

4.10 Survey Administration

The sample chosen for this study were automotive component manufacturing companies in Malaysia. Random sampling techniques were chosen in this research which is from a list were given to researcher by main automotive manufacturing companies in Malaysia. These companies were chosen because

they are the primary movers in helping the Malaysia automotive industry to be successful. Another reason were focusing on this sector are twofold. Firstly, the automotive industry has emerged as a leading sector in Malaysia in terms of adopting quality management practices and sustainable product development, and these practices are driven primarily by competitive markets, environmental regulations, stakeholder issues and customer focus. Secondly, the automotive industry has succeeded in fulfilling the government's industrialization efforts to enhance the Malaysian economy (Mahidin & Kanageswary, 2004).

The questionnaires were collected using email and posted mail received from respondents. This method is advantageous, as a wide geographical area can be covered in the survey (Sekaran, 2003). However, the return rates of mail questionnaires are typically low. The following methods are recommended by Burns (1994) in order to obtain high returns on mailed questionnaires: (1) the standard use of stamped, addressed, return envelopes for respondents to use for returning the completed questionnaires; (2) use of follow-up cards or letters in which the investigator reminds the respondent of the need to co-operate and complete the questionnaire for return; (3) suggested deadlines can be inserted in the questionnaire; (4) written letters with an official letterhead are useful and tend to increase the return rate.

4.11 Statistical Analysis Techniques

IBM Statistical Package for the Social Science (SPSS) version 19 was used to determine the statistical of data analysis in this study. Furthermore, respondent's

data were encoded into SPSS program and various statistical technique of SPSS program are used and will be discussed detail in next section.

4.12 Data Analysis Techniques

Data analysis techniques used in this research will be covered by test for normality and identify outliers of data assessment, and with other five different analyses: descriptive statistics, test of significance, skewness and kurtosis, factor analysis, reliability test, multivariate outlier, multicollinearity, Pearson test, regression analysis test and hierarchical multiple regression analysis were conducted to provide evidence and answers for achieving the research objectives.

4.12.1 Descriptive Statistics

Descriptive statistics will provide background information for the respondents. In other words, a statistic is a numerical index that describes the characteristics of a sample or samples, and a parameter is a numerical index that describes the characteristics of a population (Gay *et al.*, 2009). In general, the descriptive statistics are: (1) frequencies; a percentage of relevant charts for nominal scale or ratio scale; (2) measures of central tendency; indices that represent a typical score among a group of scores; (3) mean, the most commonly used measure of central tendency; (4) median, the midpoint in a distribution; (5) mode, the score that is attained by more subjects than any other score. Thus, in this study mainly use frequencies and mode as main descriptive statistics of data.

4.12.2 Factor Analysis

Gay *et al.* (2009) described factor analysis as a way to take a large number of variables and group them into a smaller number of clusters. Basically, factor analysis determines how variables group together based on what they may have in common. They also mentioned that factor analysis is a statistical procedure used to identify relations among variables in a correlation matrix.

After factor analysis, a reliability test was conducted. According to Hair *et al.* (2006), they defined reliability as the extent to which a variable or set of variables is consistent in what it is intended to measure. Gay *et al.* (2009) defined reliability as the degree to which a test consistently measures whatever it is measuring. The more reliable a test is, the more confidence we can have for the scores obtained from the test. Reliability is expressed numerically, usually as a reliability coefficient, which is obtained by using correlation. A Cronbach's alpha value that ranges from 0 to 1 is the most widely-used measurement for reliability (Hair *et al.*, 2010).

4.12.3 Factor Analysis Assumption

Sekaran (2003) claimed that factor analysis helps to reduce a vast number of variables to a meaningful, interpretable, and manageable set of factors. However, in factor analysis it is necessary to consider the sample size used in the study. According to Hair *et al.* (2006) it recommends a ratio 5:1 for small sample size. This means that the sample size should be five times more the items in the instrument for each factor test. Tabachnick and Fidell (2007) suggested having at least 300 cases for factor analysis. Meanwhile,

Gorsuch (1983) and Kline (1974) argued that the acceptable number of sample size is 100 cases.

However, in this study, the sample size is below than 100 cases. As recommended by Gay *et al.* (2009) factor analysis can be used in dimensionality scale in order to obtained single latent construct. In details, Pallant (2005) have recommended that some criteria for factor analysis should be fulfillment; (1) Kaiser-Meyer-Olkin's (KMO) should be value at 0.5 and above, (2) Bartlett test of sphericity must significant, (3) communalities value should be more than 0.5, (4) latern root criterion of Eigenvalue should be more than one.

4.12.4 Instrument Reliability and Validity

The reliability for instrument can be defined as a degree to which a test consistency measures whatever it is measuring (Gay *et al.*, 2009). Baddie (2001) revealed that reliability mean regardless of whenever the same procedures are used repeatedly. The Cronbach's Alpha value which is ranged from 0 to 1 is used in this study to measure the validity. According to Nunnally (1978) the Cronbach's Alpha of 0.6 an above is the acceptable value. The value closer to 1 is show the instrument was used is good reliable and score high consistency.

Validity can be defined of showing the actual condition of study. Achieving validity is not simple matter. In other meaning, it measures what is supposed to measure (Sekaran, 2005). The questionnaire use in this study

adapted and adopted from previous literature. Thus, the item below than 0.5 of communalities is dropped. As reason, face validity are necessary. According to Zikmund *et al.* (2010) there are four basic approaches to establish validity and one of them are face validity, content validity, criterion validity, and construct validity. According to Sekaran (2005) face validity those questions measure the concept of study. Meanwhile, content validity is the degree to which a test measures an intended content is (Gay *et al.*, 2009).

Criterion validity is ability of a measure to correlate with other standard measures of similar constructs or established criteria (Zikmund *et al.*, 2010). Lastly, in validity test the construct validity testifies to how well the results obtained from the use of the measure fit the theories around which the test is designed (Sekaran, 2000. p 207). In this research panel academia experts in quality management practices are use in verify the construct and content validity which is Prof. Dr. Rushami Zien Yusoff (UUM), Prof. Dr. Arawati Agus (UKM), Dr. Abdul Aziz Othman (UUM). Instead of that, there are some advices in construct and content validity from automotive industry expert in quality management department that in charge in each organization which is represent by En Huzaini Harun (Continental (M) Sdn, Bhd), En Sabaruddin Ahmad (Armstrong Auto Sdn, Bhd), En Malik Abd Rahman (IQM Industries Sdn, Bhd), En Fazali Ghazali (Modenas), and En Azizi Abdullah (Yuasa Battery (M) Sdn, Bhd). All above method are recommended by Cooper and Schindler (2006) in order to verify the content validity of the instrument. Meanwhile, this practice also can enhancement the construct of

understanding industry language that will be used in the questions for provide more reliable and valid questionnaire.

4.12.5 Test for Differences

Lohr (1999) claimed that non-response bias can occur in survey research, even with relatively high response rates. According to Armstrong and Overton (1977) non-respondents are supposed to have the same features as the not on time respondents. As suggestion by Lambert and Harrington (1990) test of differences is to indicate significance among the group. In this study, the test for differences are performed to identified the differences between the early and late response to ensure there was no response biased occur in this study.

4.12.6 Correlation Analysis

Correlation analysis is the most popular technique for indicating the relationship of one variable to another. According to Zikmund *et al.* (2010), the Pearson product moment correlation is appropriate to estimate relationships between continuous variables. Gay *et al.* (2009) considered the Spearman rho test as more precise, with a smaller number of subjects and much easier to compute results in a coefficient than the Pearson test. Zikmund *et al.* (2010) explained that the correlation coefficient, r , ranges from -1.0 to +1.0. If the value of r equals +1.0, a perfect positive relationship exists between the variables.

4.12.7 Multiple Regression Analysis

Zikmund *et al.* (2010) argued that regression analysis is another technique for measuring the linear association between a dependent and independent variable. Pallant (2007) showed that multiple regression provided information about the model as a whole and the relative contribution of each of the variables that make up the model. According to Gay *et al.* (2009) multiple regressions is a predictive equation including two or more variables that individually predict a criterion, resulting in a more accurate prediction.

Furthermore, Pallant (2007) explained that multiple regression types of analysis depend on the nature of the questions the researcher wishes to address. There are primarily three types of multiple regression analysis: standard or simultaneous, hierarchical or sequential, and stepwise. In this study, multiple regression analysis was used to explain the extent of the relationships among the research variables and to justify the level of variance to which each of the QM practices can explain the organizational performance. Due to sample size factor, the researcher has chosen multiple regressions analysis rather than other approach. Therefore, several requirements must be fulfilled in conducting multiple regression analysis such as:

1. There are linearity relationship between QM practices and organizational performance. It used SPSS residual plots to verify linearity

2. Normality of data. The data normally distributed with assessed the histogram, and normal probability (P-P) plots.
3. Multicollinearity within acceptable level: Diagnosed the variance inflation factor (VIF) below 10, and tolerance above 0.10.
4. Homoscedasticity is under control. Examined by visual of the scatter plot of regression residuals.
5. Outliers: The standardised residual specifications within ± 3.3 .

Sufficient unit of sample size in multiple regressions are important issues because it determine the overall model effect size and R square value of the study (Knofczynski & Mundfrom, 2008). Generally, in multiple regressions the determination of sample size approaches are defined into three types of categories which are known as conventional rules, statistics power and cross validation (Green, 1991). There are various suggestions in term of minimum sample size by various authors. As example, in conventional rules (Tabachnick & Fidell, 1989) recommend that the minimum number of sample size should be at 5 to 1 of each predictor (e.g. if 5 predictors used in the study, total minimum sample size is at least 25 cases). Thus, the requirement for this approach is support by Green (1991) with condition that the effect size is not at lowest value. However, Harris (1985) claimed that minimum sample size should follow the subject of $N > 50 + m$, where is (m) is number of predictor. Meanwhile, Miller and Kuncce (1973) suggested that ratio of 10 to 1 is sufficient enough for multiple regression analysis.

In this study, the sample size unit are 91 cases and it is sufficient enough to conduct the multiple regressions analysis based on recommended by Tabachnick and Fidell (1989), Harris (1985) , Miller and Kuncce (1973).

4.12.8 Hierarchical Multiple Regression Analysis

Pallant (2007) showed that hierarchical multiple regression analysis is the process of entering the independent variables into the equation in the order specified by the researcher, based on theoretical grounds. Specifically, where sets of variables are entered in steps, with each independent variable being assessed in terms of what it adds to the prediction of the dependent variable, after the previous variables have been controlled.

In this study, hierarchical regression analysis was used to determine to what extent the effect of the mediating variable of sustainable product development had in improving the relationship between quality management practices and organizational performance. The effect of organizational characteristics is moderate variable between QM practices and organizational performance.

4.13 Summary

In this chapter discusses how the research methodology are achieved by justification of the following steps, such as type of research, design of research , questionnaires construction , administration of questionnaire and statistical techniques to be used. Next chapter will discuss the research analysis data and

finding. It elaborates the result of data analysis. Thus, discuss the finding result of this study.

CHAPTER FIVE

DATA ANALYSIS AND FINDINGS

5.1 Introduction

This chapter reports the analysis and outcome of the study. The analyses were based on the data furnished by the respondents through collected questionnaires. Descriptive reports and demographic data will be shown in first section, followed second section were contains a report on specific hypotheses testing. The third section presents the correlation analysis and final section provides the summary of the chapter.

5.2 Response Rate of Questionnaires

The data of this study was gathered from 91 automotive suppliers to represents the vendors in Malaysia automotive industry as mentioned in the previous chapter. A total 125 questionnaires was distributed in first section, meanwhile in second section a total 190 questionnaires were distributed to among automotive suppliers of Proton, Perodua, Modenas, Naza, Honda, Suzuki vendor lists. After throughout checking researcher found that 15 questionnaires were uncompleted and dropped those questionnaires. Therefore, only 91 questionnaires were considered usable for analysis in this study. Table 5.1 summarizes the distribution of the questionnaire.

Table 5.1
Response rate of the Questionnaires

Response	Frequency / Rate
Distributed questionnaires	125 – 1 st / 190 – 2 nd
Returned questionnaires	106
Usable questionnaires	91
Uncompleted questionnaires	15
Response rate	55.78%
Usable response rate	47.89%

5.3 Non Respondent Bias.

According to Armstrong and Overton (1977) non-respondents are supposed to have the same features as the not on time respondents. As reason, process involves sample in early section of responses replied and late section replied is not significant result. Therefore, t-test is required to conduct in order to examine if there are any significant differences in the variables between early and late responses.

Lohr (1999) claimed that non-response bias can occur in survey research, even with relatively high response rates. However, with low response rates are not necessarily indicating nonresponse bias (Groves *et al.*, 2006). That mean, in survey research of response bias should be analysed using appropriate tools. As suggestion by Lambert and Harrington (1990) one test for non-response bias is to compare the answer of early versus late respondents to the survey. Matterson, Ivancevich, and Smith (1984) argued that voluntarily respondents which results in possibility differ in some manner. Therefore, in this study an independent sample t-test was conducted to examine the differences between two groups those are early and late responses. Table 5.2 was illustrated the results of non-response bias.

Table 5.2
Test of Non-Response Bias

Variables	Early replied N=18 (Mean)	Late replied N=73 (Mean)	Levene's Test	Sig.	Significance at 95% level
Quality Management Practices	4.94	3.24	1.882	0.174	Not. Sig.
Sustainable Product Development	2.27	1.24	0.154	0.696	Not. Sig.
Organizational Performance	2.37	1.34	1.281	0.261	Not. Sig.
Numbers of workers	2.94	2.95	0.277	0.789	Not. Sig.
Company Sales	2.83	2.84	0.108	0.866	Not. Sig.
Length of time QMP adoption	3.27	3.43	5.616	0.137	Not. Sig.

Effect size statistics provide an indication of the magnitude of the differences between groups (Pallant, 2005). Commonly used is eta squared.

$$\begin{aligned}
 \text{Eta Squared} &= (t^2) / (t^2) + (N1 + N2) - 2) \\
 &= (0.346)^2 / (0.346)^2 + (18 + 73 - 2) \\
 &= 0.011
 \end{aligned}$$

According to Cohen (1988), eta squared 0.01 (small effect), 0.06 (moderate effect), and 0.14 (large effect). The result was shown that eta squared of this study was 0.011 are considered small effect.

5.4 Personal Demographic of Respondents

This section discusses the respondent general information. It provides information of personal demographic and organizational demographic. In this section, the researcher intends to identify the personal demographic of respondents. The information includes age of respondents, gender, ethnic, nationality, highest education, current position and years of service in current position.

5.4.1 Respondents' Age

Table 5.3 provides the results for age categories of the respondents. Most of the respondents are under the category of 30-39 (40.7%) while 37.4% of the respondents are under the category of 40-49. The third group consists of respondents with age 20-29 (12.1%) and the fourth group consists of respondents with age 50-59 (9.9%).

Table 5.3
Respondents' Age.

Age of respondents	Frequency	Percentage (%)
20 to 29 Years	11	12.1
30 to 39 Years	37	40.7
40 to 49 Years	34	37.4
50 to 59 Years	9	9.9
Total	91	100

5.4.2 Respondents' Gender

The results in Table 5.4 show that majority of the respondent are male. They are representing 82.4% from the research sample size, while 17.6% of respondents are female. The result shown male is nominating among executive position of the organization.

Table 5.4
Respondents' Gender

Gender of respondents	Frequency	Percentage (%)
Male	75	82.4
Female	16	17.6
Total	91	100

5.4.3 Respondents' Ethnic

Table 5.5 illustrates that 74.7% of the respondents are Malay ethnic, while 20.9% are Chinese ethnic and India ethnic of the respondents which represent 4.4%.

Table 5.5
Respondents' Ethnic

Ethnic of respondents	Frequency	Percentage (%)
Malay	68	74.7
Chinese	19	20.9
India	4	4.4
Total	91	100

5.4.4. Respondents' Nationality

Table 5.6 provides the results of respondents' nationality. Most of the respondents are Malaysian (97.8%), while 2.2 % of the respondents are non-Malaysian.

Table 5.6
Respondents' Nationality

Nationality of respondents	Frequency	Percentage (%)
Malaysian	89	97.8
Non Malaysian	2	2.2
Total	91	100

5.4.5 Respondents’ Higher Qualification

In this study, the researcher classifies academic qualification rank into four which are as follows: (1) doctorate; (2) masters; (3) bachelor; and (4) diploma or others. The descriptive analysis shown that 18 of the respondents are diploma which represents 19.8% from the sample, 64 respondents (70.3%) are bachelor, while 9 respondents (9.9%) have master. Table 5.7 below shows the respondents’ higher qualification.

Table 5.7
Respondents’ Higher Qualification.

Highest education	Frequency	Percentage (%)
Diploma	18	19.8
Bachelor	64	70.3
Master	9	9.9
Doctorate	0	0
Total	91	100

5.4.6 Respondents’ Current Position

Table 5.8 illustrates that 2.2% of the respondents are CEO of the organization, while 11% are general manager. Forty eight (48) of the respondents which represent 52.7% are manager, while 12.1% of the respondents are engineer and 20 of the respondents which represent 22% are executive. This show majority of respondents are from managerial level.

Table 5.8
Respondents’ Current Position.

Current position	Frequency	Percentage (%)
CEO	2	2.2
General Manager	10	11
Manager	48	52.7
Engineer	11	12.1
Executive	20	22
Total	91	100

5.4.7 Respondents’ Year of Service

Table 5.9 illustrates that 24.2% of the respondents have 1-3 years and 4-6 years working experience in current service position respectively, while 19.8% have 7-10 years working experience. Twenty nine (29) of the respondents which represent 31.9% have more than 11 years working experience. This shows that most of respondents are well experienced in automotive industry, in turn, it relevance of this research study.

Table 5.9
Respondents’ Year of Service

Year of service	Frequency	Percentage (%)
1 ~ 3 years	22	24.2
4 ~ 6 years	22	24.2
7 ~ 10 years	18	19.8
More 11 years	29	31.9
Total	91	100

5.5 Organizational Demographic of Respondents.

In this section, the researcher intends to identify the organizational demographic of respondents. The information includes main product of organization, your customer, number of workers, annual sales turn over, length of time quality management practices adoption, length of time sustainable product development adoption, quality or environmental management system that have been adopting in organization and ownership of the company.

5.5.1 Respondents' Product Customer

The results in Table 5.10 show that majority of respondents' product customer are foreign market. They are representing 72.5% from the research sample size, while 27.5% of the respondents are local market. This result with reflects the quality of automotive products are produce by Malaysia is widely accepted by foreign market.

Table 5.10
Respondents' Product Customer

Respondents Customer	Frequency	Percentage (%)
Local	25	27.5
Foreign	66	72.5
Total	91	100

5.5.2 Number of Workers in Organization

Table 5.11 provides the results for number of workers in organization of the respondents. Most of the respondents are under the category of 51-150 workers (95.6%) while 4.4% of the respondents are under the category of 6-50 workers.

Table 5.11
Number of Workers in Organization

No. of workers	Frequency	Percentage (%)
1 ~ 5 workers	0	0
6 ~ 50 workers	4	4.4
51 ~ 150 workers	87	95.6
Total	91	100

5.5.3 Company Sales Turn Over (RM Million)

Table 5.12 illustrates the results for company sales turnover of the respondents. Most of the respondents are under the category of sales turnover RM 10.1 Million- RM 25 Million (84.6%) while 15.4% of the respondents are under the category of RM 250,000 – RM 10 Million. The result shows that majority of respondents are categorized as medium enterprise industry.

Table 5.12
Company Sales Turnover (RM Million)

Sales turn over	Frequency	Percentage (%)
1 ~ 250K	0	0
251K ~ 10M	14	15.4
10.1M ~ 25M	77	84.6
Total	91	100

5.5.4 Length of time Quality Management Practices Adoption

The results in Table 5.13 show that majority of respondents’ length of time quality management practices adoption are more than 11 years. They are representing 57.1% from the research sample size, while 29.7% of the respondents are adopting in range 7-10 years. Nine (9) of the respondents which represent 9.9%, have adopting quality management practices between 4-6 years and only 3.3% of the respondents below than 3 years.

Table 5.13
Length of time Quality Management Practices Adoption

Length of time QMP	Frequency	Percentage (%)
1 ~ 3 years	3	3.3
4 ~ 6 years	9	9.9
7 ~ 10 years	27	29.7
More than 11 years	52	57.1
Total	91	100

5.5.5 Length of time Sustainable Product Development Adoption.

Table 5.14 illustrates the result for length of time sustainable product development adoption among the respondents. They are still new in implementing the sustainable product development in their industry.

Table 5.14
Length of time Sustainable Product Development Adoption

Length of time SPD	Frequency	Percentage (%)
1 ~ 3 years	29	31.9
4 ~ 6 years	24	26.4
7 ~ 10 years	23	25.3
More than 11 years	15	16.5
Total	91	100

Table 5.14 show that almost 31.9% of the respondents are adopting sustainable product development in range 1-3 years, while 26.4% of the respondents are adopting between 4-6 years, 25.3% of the respondents are adopting between 7-10 years and among them only 16.5% have been adopting sustainable product development for more than 11 years

5.5.6 Type of Management System Used by Respondents'

The results in Table 5.15 show that majority of the respondents' have use ISO TS 16949:2009 Quality Management System in their operation. They are representing 84.6% from the total of the respondents, while 15.4% have implementing ISO 9001:2008 as their quality management system in their daily operation.

Table 5.15

Type of Management System use by Respondents

System Management	Frequency	Percentage (%)
ISO 9001:2008	14	15.4
ISO TS 16949:2009	77	84.6
Total	91	100

5.5.7 Respondents' Ownership

Table 5.16 provides the results of respondents' ownership. Most of the respondents are private owned (38.5%), while 22 % of the respondents are foreign owned. Followed by joint ventured are representing 17.6% of the respondents, while public owned are representing 14.3%. Lastly, family owned company is representing 7.7% of the respondents.

Table 5.16

Respondents' Ownership

Type of ownership	Frequency	Percentage (%)
Family owned	7	7.7
Private owned	35	38.5
Public owned	13	14.3
Foreign owned	20	22
Joint ventured	16	17.6
Total	91	100

5.6 Summary of Respondents' Demographic

The researchers summarize the result of respondents' demographic in Table 5.17, which includes respondents' age, gender, ethnic, nationality, high qualification, respondents' current position, years of service, customer products, number of workers, company sales turn over, length of time quality management practices adoption, length of time sustainable product development adoption, type of management system, and respondents' ownership.

Table 5.17

Summary of the Respondents Demographic.

Age of respondents	Frequency	Percentage (%)
20 ~ 29 Years	11	12.1
30 ~ 39 Years	37	40.7
40 ~ 49 Years	34	37.4
50 ~ 59 Years	9	9.9
Total	91	100
Gender of respondents	Frequency	Percentage (%)
Male	75	82.4
Female	16	17.6
Total	91	100
Ethnic of respondents	Frequency	Percentage (%)
Malay	68	74.7
Chinese	19	20.9
India	4	4.4
Total	91	100
Nationality of respondents	Frequency	Percentage (%)
Malaysian	89	97.8
Non Malaysian	2	2.2
Total	91	100
Highest education	Frequency	Percentage (%)
Diploma	18	19.8
Bachelor	64	70.3
Master	9	9.9
Total	91	100
Current position	Frequency	Percentage (%)
CEO	2	2.2
General Manager	10	11
Manager	48	52.7
Engineer	11	12.1
Executive	20	22
Total	91	100
Year of service	Frequency	Percentage (%)
1 ~ 3 years	22	24.2
4 ~ 6 years	22	24.2
7 ~ 10 years	18	19.8
More 11 years	29	31.9
Total	91	100

Table 5.17 (Continued)
Summary of the Respondents Demographic results

Respondents Customer	Frequency	Percentage (%)
Local	25	27.5
Foreign	66	72.5
Total	91	100

No. of workers	Frequency	Percentage (%)
1 ~ 5 workers	0	0
6 ~ 50 workers	4	4.4
51 ~ 150 workers	87	95.6
Total	91	100

Sales turn over	Frequency	Percentage (%)
1 ~ 250K	0	0
251K ~ 10M	14	15.4
10.1M ~ 25M	77	84.6
Total	91	100

Length of time QMP	Frequency	Percentage (%)
1 ~ 3 years	3	3.3
4 ~ 6 years	9	9.9
7 ~ 10 years	27	29.7
More than 11 years	52	57.1
Total	91	100

Length of time SPD	Frequency	Percentage (%)
1 ~ 3 years	29	31.9
4 ~ 6 years	24	26.4
7 ~ 10 years	23	25.3
More than 11 years	15	16.5
Total	91	100

System Management	Frequency	Percentage (%)
ISO 9001:2008	14	15.4
ISO TS 16949:2009	77	84.6
Total	91	100

Type of ownership	Frequency	Percentage (%)
Family owned	7	7.7
Private owned	35	38.5
Public owned	13	14.3
Foreign owned	20	22
Joint ventured	16	17.6
Total	91	100

5.7 Data Screen and Cleaning

According to Gay *et al*, (2009) data analysis and interpretation are critical steps in the research process that require the researchers both to know and to understand the data. There are two method used to determine the sample data is normally distributed in the population are numerical measures and graphic measures. In this study, Skewness and Kurtosis test are performed to determine about distribution of obtained data is normal. The ranges within ± 1.0 are considered to be normal (Hair *et al.*, 2007).

Table 5.18 illustrated the result of Skewness and Kurtosis Test.

Table 5.18
Skewness and Kurtosis Test

Variables	N	Skewness		Kurtosis	
		Statistic	Std. Error	Statistic	Std. Error
QMP	91	-0.419	0.253	-0.214	0.500
SPD	91	-0.599	0.253	0.423	0.500
OP	91	-0.383	0.253	0.097	0.500

Note: (QMP) Quality Management Practices: (SPD) Sustainable Product Development: (OP) Organizational Performance: (N) Number of Respondents.

5.7.1 Goodness of Measure

The goodness and suitability of respondents’ data were examined by using the validity and reliability test. According to Zikmund *et al*, (2010) good measures should be both consistent and accurate.

5.7.2 Validity

Achieving validity is not a simple matter. Zikmund at al, (2010) argued that four basic approaches to establishing validity which are: (1) face validity, (2) content validity, (3) criterion validity, and (4) construct validity.

Meanwhile, Gay *et al.*, (2009) stressed that forms of validity are consists of: (1) content validity, (2) criterion validity, (3) construct validity, and (4) consequential validity.

Instruments used this study are tested by following requirements. Content validity is the degree to which a test measures an intended content is (Gay *et al.*, 2009). As recommended by Gay *et al.*, (2009) content validity is determined by expert judgement. This research of contents validity is came from two sources, firstly is a comprehensive literature review, and secondly from academic and professional experts. Therefore, to review the items related to content validity in this study there are four professional in automotive industry and four experts are academic lecturer in quality management field.

Second test is criterion validity, explained by Zikmund *et al.*, (2010) criterion validity is ability of a measure to correlate with other standard measures of similar constructs or established criteria. In this study, the Pearson correlation, Tolerance value and VIF value are tested in order to conduct the criterion validity (Emery *et al.*, 2003; Friedman *et al.*, 2004).

The third test is convergent and discriminant validity, in this study an exploratory factor analysis (EFA) is used to test the instrument validity (Gay *et al.*, 2009). He also added that factor analysis can be used in dimensionality scale in order to obtained single latent construct. Davis *et al.*, (1989) argued that factor analysis can verify the convergent and discriminant validity. According to Sekaran (2003) factors analysis helps to reduce a vast number of variables to a meaningful, interpretable, and manageable set of factors. In

term of sample size, Tabachnick and Fidell (2007) suggested to have at least 300 cases for factor analysis. However, in this study only 91 cases were used for factor analysis. Hair *et al*, (2006) recommends a 5 to 1 ratio for small sample size. As reason, this study used factor analysis by dimensions.

Some criteria of factor analysis are needed to be fulfilment such as:-

1. KMO (Kaiser-Meyer-Olkin's) measure of sampling adequacy should be value at 0.5 (Pallant, 2005), however the value 0.6 and above most preferred.
2. Bartlett's test of sphericity must significant (Pallant, 2005).
3. Communalities value should be more than 0.5 (Field, 2005).
4. Latent root criterion of Eigenvalue should be more than 1 (Kaiser, 1974).

Above criteria are needed to comply for cross loading (Igbaria *et al.*, 1995). And each items of loading value should be more than 0.5. The rotated component matrix table shown the reading of cross loading values and recommended to remove those value which are lowest than 0.5 (Coakes & Steed, 2003).

5.7.2.1 Factor Analysis Result of Independent Variables

Following result are shown of factor analysis of independent variables of quality management practices in details. Each factor analysis result are meets the requirements.

5.7.2.1.1 Factor Analysis of Leadership.

Table 5.19 are illustrated the result of KMO (Kaiser-Meyer-Olkin), MSA (Measure of Sampling Adequacy) and BTS (Bartlett’s Test of Sphericity) of leaderships.

Table 5.19
Factor Analysis of Leadership

Leadership	Factor	Communalities
LS02	.848	.719
LS03	.779	.608
LS04	.829	.687
LS05	.852	.726
LS06	.834	.696
<i>Eigenvalue</i>		3.43
<i>Percentage of Variance</i>		68.7
<i>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</i>		.868
<i>Bartlett’s Test of Sphericity</i>		229.33
<i>Sig.</i>		.000

From Table 5.19 it can be seen that the value of KMO (Kaiser-Meyer-Olkin), MSA (Measure of Sampling Adequacy) was .868, which according to Kaiser (1974) is acceptable. The BTS (Bartlett’s Test of Sphericity) value was 229.33 and significant was (.000). The KMO, MSA and BTS values indicated that leaderships of quality management practices were fit for factor analysis. There were 5 items have been measured and LS1item is removed due to communalities value is below than 0.5.

Table 5.20
Cronbach’s Alpha of Leadership

Variables	Items	Deleted Items	Cronbach’s Alpha
Leadership	6	1	0.883

Reliability test were conducted to determine the consistency of the constructs using Cronbach's Alpha. In Table 5.20 was illustrated result of Cronbach's Alpha was (0.883) it were above the minimum acceptable value (0.6) as recommended by Nunnally (1978).

5.7.2.1.2 Factor Analysis of Human Resources Management.

The KMO, MSA and BTS results for human resources management of quality management practices are illustrated in Table 5.21.

Table 5.21
Factor Analysis of Human Resources Management

Human Resources	Factor	Communalities
HR1	.835	.696
HR2	.812	.660
HR3	.765	.585
HR5	.742	.551
<i>Eigenvalue</i>		2.49
<i>Percentage of Variance</i>		62.2
<i>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</i>		.755
<i>Bartlett's Test of Sphericity</i>		109.84
<i>Sig.</i>		.000

Table 5.21 shows that KMO and MSA value for the human resources items was .755, which is meritorious and suitable for conducting factor analysis. The BTS value was 109.84 and significant (.000). There were 4 items have been measured, which HR4 have been removed due to communalities value is below than 0.5. The KMO, MSA and BTS value indicated that the human resources items were appropriate for factor analysis.

Table 5.22
Cronbach's Alpha of Human Resources

Variables	Items	Deleted Items	Cronbach's Alpha
Human Resources	5	1	0.798

Reliability test were conducted to determine the consistency of the constructs using Cronbach's Alpha. In Table 5.22 shows the values of Cronbach's Alpha was (0.798) were above the minimum acceptable value (0.6) as recommended by Nunnally (1978).

5.7.2.1.3 Factor Analysis of Supplier Management.

The KMO, MSA and BTS results for supplier management of quality management practices are illustrated in Table 5.23.

Table 5.23
Factor Analysis of Supplier Management

Supplier Management	Factor	Communalities
SM01	.745	.555
SM03	.833	.695
SM04	.823	.678
SM05	.828	.686
SM06	.719	.517
<i>Eigenvalue</i>		3.13
<i>Percentage of Variance</i>		62.6
<i>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</i>		.812
<i>Bartlett's Test of Sphericity</i>		187.71
<i>Sig.</i>		.000

Table 5.23 shows that KMO and MSA value for the human resources items was .812, which is meritorious and suitable for conducting factor analysis. The BTS value was 187.71 and significant (.000). There were 5

items have been measured, which SM02 have been removed due to communalities value is below than 0.5. The KMO, MSA and BTS value indicated that the supplier management items were appropriate for factor analysis.

Table 5.24
Cronbach's Alpha of Supplier Management

Variables	Items	Deleted Items	Cronbach's Alpha
Supplier Management	6	1	0.845

Reliability test were conducted to determine the consistency of the constructs using Cronbach's Alpha. In Table 5.24 shows the values of Cronbach's Alpha was (0.845) were above the minimum acceptable value (0.6) as recommended by Nunnally (1978).

5.7.2.1.4 Factor Analysis of Customer Focus.

The KMO, MSA and BTS results for customer focus of quality management practices are illustrated in Table 5.25.

Table 5.25
Factor Analysis of Customer Focus

Customer Focus	Factor	Communalities
CF1	.771	.594
CF2	.773	.597
CF3	.807	.652
CF4	.732	.535
<i>Eigenvalue</i>		2.37
<i>Percentage of Variance</i>		59.4
<i>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</i>		.727
<i>Bartlett's Test of Sphericity</i>		94.47
<i>Sig.</i>		.000

Table 5.25 shows that KMO and MSA value for the human resources items was .727, which is meritorious and suitable for conducting factor analysis. The BTS value was 94.47 and significant (.000). There were 4 items have been measured, which CF5 have been removed due to communalities value is below than 0.5. The KMO, MSA and BTS value indicated that the customer focus items were appropriate for factor analysis.

Table 5.26
Cronbach's Alpha of Customer Focus

Variables	Items	Deleted Items	Cronbach's Alpha
Customer Focus	5	1	0.767

Reliability test were conducted to determine the consistency of the constructs using Cronbach's Alpha. In Table 5.26 shows the values of Cronbach's Alpha was (0.767) were above the minimum acceptable value (0.6) as recommended by Nunnally (1978).

5.7.2.1.5 Factor Analysis of Process Approach.

The KMO, MSA and BTS results for process approach of quality management practices are illustrated in Table 5.27.

Table 5.27
Factor Analysis of Process Approach

Process Approach	Factor	Communalities
PA1	.752	.566
PA2	.832	.692
PA3	.882	.778
PA4	.872	.761
PA5	.867	.752
<i>Eigenvalue</i>		3.54
<i>Percentage of Variance</i>		70.9
<i>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</i>		.872
<i>Bartlett's Test of Sphericity</i>		206.67
<i>Sig.</i>		.000

Table 5.27 shows that KMO and MSA value for the process approach items was .872, which is meritorious and suitable for conducting factor analysis. The BTS value was 206.67 and significant (.000). There were no items have been removed due to communalities value is above than 0.5. The KMO, MSA and BTS value indicated that the process approach items were appropriate for factor analysis.

Table 5.28
Cronbach's Alpha of Process Approach

Variables	Items	Deleted Items	Cronbach's Alpha
Process Approach	5	-	0.897

Reliability test were conducted to determine the consistency of the constructs using Cronbach's Alpha. In Table 5.28 shows the values of Cronbach's Alpha was (0.897) were above the minimum acceptable value (0.6) as recommended by Nunnally (1978).

5.7.2.1.6 Factor Analysis of Design Product

The KMO, MSA and BTS results for design product of quality management practices are illustrated in Table 5.29.

Table 5.29
Factor Analysis of Design Product

Design Product	Factor	Communalities
DP1	.758	.574
DP3	.824	.679
DP4	.768	.590
DP5	.897	.804
<i>Eigenvalue</i>		2.64
<i>Percentage of Variance</i>		66.1
<i>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</i>		.736
<i>Bartlett's Test of Sphericity</i>		144.62
<i>Sig.</i>		.000

Table 5.29 shows that KMO and MSA value for the design product items was .736, which is meritorious and suitable for conducting factor analysis. The BTS value was 144.62 and significant (.000). There were 4 items have been measured, which DP2 have been removed due to communalities value is below than 0.5. The KMO, MSA and BTS value indicated that the design product items were appropriate for factor analysis.

Table 5.30
Cronbach's Alpha of Design of Product

Variables	Items	Deleted Items	Cronbach's Alpha
Design of Product	5	1	0.828

Reliability test were conducted to determine the consistency of the constructs using Cronbach's Alpha. In Table 5.30 shows the values of Cronbach's Alpha was (0.828) were above the minimum acceptable value (0.6) as recommended by Nunnally (1978).

5.7.2.1.7 Factor Analysis of Strategy Planning

Table 5.31 is illustrated KMO, MSA and BTS results for strategy planning of quality management practices.

Table 5.31
Factor Analysis of Strategy Planning

Strategy Planning	Factor	Communalities
SP1	.836	.699
SP2	.882	.778
SP3	.863	.744
SP4	.912	.832
SP5	.791	.626
<i>Eigenvalue</i>		3.67
<i>Percentage of Variance</i>		73.5
<i>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</i>		.844
<i>Bartlett's Test of Sphericity</i>		306.41
<i>Sig.</i>		.000

Table 5.31 shows that KMO and MSA value for the strategy planning items was .844, which is meritorious and suitable for conducting factor analysis. The BTS value was 306.41 and significant (.000). There were no items have been removed due to communalities value is above than 0.5. The KMO, MSA and BTS value indicated that the strategy planning items were appropriate for factor analysis.

Table 5.32
Cronbach's Alpha of Strategy Planning

Variables	Items	Deleted Items	Cronbach's Alpha
Strategy Planning	5	-	0.909

Reliability test were conducted to determine the consistency of the constructs using Cronbach's Alpha. In Table 5.32 shows the values of Cronbach's Alpha was (0.909) were above the minimum acceptable value (0.6) as recommended by Nunnally (1978).

5.7.2.1.8 Factor Analysis of Information Analysis

The KMO, MSA and BTS results for information analysis of quality management practices are illustrated in Table 5.33.

Table 5.33
Factor Analysis of Information Analysis

Information Analysis	Factor	Communalities
IA1	.868	.753
IA2	.859	.737
IA3	.852	.726
IA4	.910	.829
IA5	.869	.755
<i>Eigenvalue</i>		3.80
<i>Percentage of Variance</i>		75.9
<i>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</i>		.895
<i>Bartlett's Test of Sphericity</i>		312.75
<i>Sig.</i>		.000

Table 5.33 shows that KMO and MSA value for the information analysis items was .895, which is meritorious and suitable for conducting factor analysis. The BTS value was 312.75 and significant (.000). There were

no items have been removed due to communalities value is above than 0.5. The KMO, MSA and BTS value indicated that the information analysis approach items were appropriate for factor analysis.

Table 5.34
Cronbach's Alpha of Information Analysis

Variables	Items	Deleted Items	Cronbach's Alpha
Information Analysis	5	-	0.921

Reliability test were conducted to determine the consistency of the constructs using Cronbach's Alpha. In Table 5.34 shows the values of Cronbach's Alpha was (0.921) were above the minimum acceptable value (0.6) as recommended by Nunnally (1978).

5.7.2.1.9 Factor Analysis of Continuous Improvement

Table 5.35 is illustrated KMO, MSA and BTS results for continuous improvement of quality management practices.

Table 5.35
Factor Analysis of Continuous Improvement

Continuous Improvement	Factor	Communalities
CI1	.889	.790
CI2	.857	.734
CI3	.834	.695
CI4	.879	.773
CI5	.903	.815
<i>Eigenvalue</i>		<i>3.80</i>
<i>Percentage of Variance</i>		<i>76.1</i>
<i>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</i>		<i>.866</i>
<i>Bartlett's Test of Sphericity</i>		<i>325.04</i>
<i>Sig.</i>		<i>.000</i>

Table 5.35 shows that KMO and MSA value for the continuous improvement items was .866, which is acceptable and suitable for conducting factor analysis. The BTS value was 325.04 and significant (.000). There were no items have been removed due to communalities value is above than 0.5. The KMO, MSA and BTS value indicated that the continuous improvement items were appropriate for factor analysis.

Table 5.36

Cronbach's Alpha of Continuous Improvement

Variables	Items	Deleted Items	Cronbach's Alpha
Continuous Improvement	5	-	0.919

Reliability test were conducted to determine the consistency of the constructs using Cronbach's Alpha. In Table 5.36 shows the values of Cronbach's Alpha were (0.919) above the minimum acceptable value (0.6) as recommended by Nunnally (1978).

5.7.2.2 Factor Analysis Result of Mediator Variables

Following result are shown of factor analysis of mediator variables of sustainable product development in details. Each factor analysis result is meets with requirements.

5.7.2.2.1 Factor Analysis of Economic of SPD

The KMO, MSA and BTS results for economical of sustainable product development are illustrated in Table 5.37

Table 5.37
Factor Analysis of Economical SPD

Economical	Factor	Communalities
EC1	.741	.550
EC2	.909	.827
EC3	.865	.748
EC4	.834	.695
<i>Eigenvalue</i>		2.82
<i>Percentage of Variance</i>		70.5
<i>Kaiser-Meyer-Olkin Measure of Sampling Adequancy</i>		.769
<i>Bartlett's Test of Sphericity</i>		177.78
<i>Sig.</i>		.000

Table 5.37 shows that KMO and MSA value for the economical items was .769, which is meritorious and suitable for conducting factor analysis. The BTS value was 177.78 and significant (.000). There were 4 items have been measured, which EC5 have been removed due to communalities value is below than 0.5. The KMO, MSA and BTS value indicated that the economic of sustainable product development items were appropriate for factor analysis.

Table 5.38
Cronbach's Alpha of Economic of SPD

Variables	Items	Deleted Items	Cronbach's Alpha
Economic	5	1	0.851

Reliability test were conducted to determine the consistency of the constructs using Cronbach's Alpha. In Table 5.38 shows the values of Cronbach's Alpha were (0.851) above the minimum acceptable value (0.6) as recommended by Nunnally (1978).

5.7.2.2.2 Factor Analysis of Environment of SPD

Table 5.39 are illustrated KMO, MSA and BTS results for environment of sustainable product development.

Table 5.39
Factor Analysis of Environment of SPD

Environment	Factor	Communalities
EN1	.809	.665
EN2	.883	.780
EN3	.841	.707
EN4	.842	.708
EN5	.845	.715
<i>Eigenvalue</i>		3.65
<i>Percentage of Variance</i>		71.3
<i>Kaiser-Meyer-Olkin Measure of Sampling Adequancy</i>		.754
<i>Bartlett's Test of Sphericity</i>		303.64
<i>Sig.</i>		.000

Table 5.39 shows that KMO and MSA value for the environmental items was .754, which is acceptable and suitable for conducting factor analysis. The BTS value was 303.64 and significant (.000). There were no items have been removed due to communalities value is above than 0.5. The KMO, MSA and BTS value indicated that the environmental items were appropriate for factor analysis.

Table 5.40
Cronbach's Alpha of Environment of SPD

Variables	Items	Deleted Items	Cronbach's Alpha
Environment	5	-	0.898

Reliability test were conducted to determine the consistency of the constructs using Cronbach's Alpha. In Table 5.40 shows the values of Cronbach's Alpha were (0.898) above the minimum acceptable value (0.6) as recommended by Nunnally (1978).

5.7.2.2.3 Factor Analysis of Society of SPD

The KMO, MSA and BTS results for society of sustainable product development are illustrated in Table 5.41.

Table 5.41
Factor Analysis of Society of SPD

Society	Factor	Communalities
SC1	.836	.700
SC2	.889	.790
SC3	.840	.706
SC5	.820	.673
<i>Eigenvalue</i>		2.86
<i>Percentage of Variance</i>		71.7
<i>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</i>		.738
<i>Bartlett's Test of Sphericity</i>		190.24
<i>Sig.</i>		.000

Table 5.41 shows that KMO and MSA value for the society items was .738, which is meritorious and suitable for conducting factor analysis. The BTS value was 190.24 and significant (.000). There were 4 items have been measured, which SC4 have been removed due to communalities value is below than 0.5. The KMO, MSA and BTS value indicated that the society of sustainable product development items were appropriate for factor analysis.

Table 5.42
Cronbach's Alpha of Society SPD

Variables	Items	Deleted Items	Cronbach's Alpha
Society	5	1	0.867

Reliability test were conducted to determine the consistency of the constructs using Cronbach's Alpha. In Table 5.42 shows the values of Cronbach's Alpha were (0.867) above the minimum acceptable value (0.6) as recommended by Nunnally (1978).

5.7.2.3 Factor Analysis Result of Dependent Variables

Following result are shown of factor analysis of dependent variables of organizational performance details. Each factor analysis result is meets with requirements.

5.7.2.3.1 Factor Analysis of Financial

The KMO, MSA and BTS results for financial of organizational performance are illustrated in Table 5.43.

Table 5.43
Factor Analysis of Financial

Financial	Factor	Communalities
FP1	.886	.785
FP2	.838	.702
FP3	.767	.589
FP4	.909	.826
FP5	.897	.805
FP6	.903	.815
<i>Eigenvalue</i>		4.52
<i>Percentage of Variance</i>		75.3
<i>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</i>		.877
<i>Bartlett's Test of Sphericity</i>		478.42
<i>Sig.</i>		.000

Table 5.43 shows that KMO and MSA value for the financial items was .877, which is meritorious and suitable for conducting factor analysis. The BTS value was 478.42 and significant (.000). There were 6 items have been measured, which no items have been removed due to communalities value is more than 0.5. The KMO, MSA and BTS value indicated that the financial of organizational performance items were appropriate for factor analysis.

Table 5.44
Cronbach's Alpha of Financial

Variables	Items	Deleted Items	Cronbach's Alpha
Financial	6	-	0.934

Reliability test were conducted to determine the consistency of the constructs using Cronbach's Alpha. In Table 5.44 shows the values of Cronbach's Alpha were (0.934) above the minimum acceptable value (0.6) as recommended by Nunnally (1978).

5.7.2.3.2 Factor Analysis of Non-Financial.

The KMO, MSA and BTS results for non-financial of organizational performance are illustrated in Table 5.45.

Table 5.45
Factor Analysis of Non-Financial

Non-Financial	Factor	Communalities
NF1	.827	.684
NF2	.782	.611
NF3	.861	.741
NF4	.860	.740
NF5	.829	.687
NF6	.819	.672
NF7	.818	.669
NF8	.799	.638
NF9	.831	.690
NF10	.786	.618
<i>Eigenvalue</i>		6.75
<i>Percentage of Variance</i>		67.5
<i>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</i>		.886
<i>Bartlett's Test of Sphericity</i>		787.78
<i>Sig.</i>		.000

Table 5.45 shows that KMO and MSA value for the financial items was .886, which is meritorious and suitable for conducting factor analysis. The BTS value was 787.78 and significant (.000). There were 10 items have been measured, which no items have been removed due to communalities value is more than 0.5. The KMO, MSA and BTS value indicated that the non-financial of organizational performance items were appropriate for factor analysis.

Table 5.46
Cronbach's Alpha of Non-Financial

Variables	Items	Deleted Items	Cronbach's Alpha
Non-Financial	10	-	0.945

Reliability test were conducted to determine the consistency of the constructs using Cronbach's Alpha. In Table 5.46 shows the values of

Cronbach's Alpha were (0.945) above the minimum acceptable value (0.6) as recommended by Nunnally (1978).

5.7.2.4 Reliability Test

According to Gay *et al.* (2009) reliability is the degree to which a test consistency measures whatever it is measuring. Baddie (2001) claimed that reliability means regardless of whenever the same procedures are used repeatedly. The measurement of reliability is Cronbach's Alpha, which is ranged from 0 to 1. According to Nunnally (1978) the value of Cronbach's Alpha of 0.6 is the acceptable.

In this study, Cronbach's Alpha was conducted to be obtained consistency for the measurement items. In this regard, reliability test was conducted after factor analysis, and result of reliability for each factors were summarized after each factor analysis shown in Table 5.47.

Table 5.47
Summary of Reliability Test

Variables	Items	Deleted Items	Cronbach's Alpha
QM Practices			
Leadership	6	1	0.883
Human Resources	5	1	0.798
Supplier Management	6	1	0.845
Customer Focus	5	1	0.767
Process Approach	5	-	0.897
Design of Products	5	1	0.828
Strategy Planning	5	-	0.909
Information Analysis	5	-	0.921
Continuous Improvement	5	-	0.919
SPD			
Economic of SPD	5	1	0.851
Environment of SPD	5	-	0.898
Society of SPD	5	1	0.867
OP			
Financial	6	-	0.934
Non-Financial	10	-	0.945
Old items			78
New items			71

Note: QM (Quality Management), SPD: Sustainable Product Development,
 OP: Organizational Performance

Table 5.47 illustrates the result of Cronbach's value was above the minimum value (0.6) as suggested by Nunnally (1978). Seven items have been removed (LS1, HR4, SM2, CF5, DP1, EC5, and SC4) as to meet the requirement. This result provide confident to undertake the subsequent analysis.

5.8 Framework Review after Factor Analysis

Table 5.48 illustrates result of summarizes the changes that happened after factor analysis test. The result also showed the component before factor analysis and the final components after factor analysis test. There were 7 items was deleted from total of 78 items that consists in this study and illustrated a confidence to use above variables for the subsequent analysis.

Table 5.48
Summary of Final Variables for Analysis

Variables	Old Items	New Items
Leadership	6	5
Human Resources	5	4
Supplier Management	6	5
Customer Focus	5	4
Process Approach	5	5
Design of Products	5	4
Strategy Planning	5	5
Information Analysis	5	5
Continuous Improvement	5	5
Economic of SPD	5	4
Environment of SPD	5	5
Society of SPD	5	4
Financial	6	6
Non-Financial	10	10

5.9 Descriptive Analysis of Study Variables

All variables in this study are subject to explore the descriptive statistics in order to identify their characteristics. Descriptive statistics are methods used to organize, display, describe and explain a set of data with use of tables, graphs, and

summary measures (Norusis, 1997). The results of these descriptive statistics are presented separately for each item in each variable in respect of 91 valid cases of the study. Result is shown in Table 5.49.

Table 5.49
Summary of Descriptive Analysis

Variables	Mean (M)	Standard Deviation (SD)	N
Quality Management	5.05	.572	91
Leadership	5.26	.631	91
Human Resources	4.90	.699	91
Supplier Management	5.09	.664	91
Customer Focus	5.47	.491	91
Process Approach	5.05	.702	91
Design of Products	4.92	.785	91
Strategy Planning	4.97	.747	91
Information Analysis	4.92	.767	91
Continuous Improve	4.90	.812	91
Sustainable Product	4.78	.708	91
Economic	4.59	.775	91
Environment	5.06	.779	91
Society	4.82	.873	91
OP	4.70	.704	91
Financial	4.67	.777	91
Non-Financial	4.72	.724	91

Note: *OP (Organizational Performance), OC (Organization Characteristics)*

In Table 5.48 illustrates that the interpretation of the mean scores, use measurement scale of 1- 6 were 1 is indicated too low and 6 indicated is too high. Mean score above 3 was considered as high and below 3 was considered as low (National Institute of Standard and Technology, 2010). The standard deviation values are ranged above 3 which reflect the existence of considerably acceptable variability within data set. Meanwhile, on organization characteristics descriptive analysis

statistics were above 1.5 is referring to the high and positive agreement and standard deviation values are ranged 1.75 to 3.40.

5.9.1 Descriptive Analysis of Leadership

Table 5.50 illustrated descriptive analysis of mean value of the leadership of quality management practices. The results indicated that mean value was (5.26). This indicated the most of the respondents expressed their agreement with the all statement under leaderships.

Table 5.50

Descriptive Analysis of Leadership

Variables	Mean (M)	Standard Deviation (SD)	N (Total)
Leadership	5.26	.631	91

Table 5.51 illustrates the each mean value of the element in leadership of quality management practices. The results indicated that mean value fall between (5.11) to (5.42). This indicated the most of the respondents expressed their agreement with the items statement under leadership. The highest score was LS6 (5.42) which company leaders are pursue long term business success.

Table 5.51

Descriptive Analysis of Items in Leadership

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
LS2	5.40	.713	91
LS3	5.18	.811	91
LS4	5.11	.836	91
LS5	5.22	.786	91
LS6	5.42	.668	91

5.9.2 Descriptive Analysis of Human Resources

Table 5.52 indicates the descriptive analysis of mean value of the human resources of quality management practices. The results indicated mean value was (4.90). This indicated the most of respondents expresses their agreement with all statement under human resources.

Table 5.52
Descriptive Analysis of Human Resources

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
Human Resources	4.90	.699	91

Table 5.53 indicates that mean value fall between (4.73) to (5.07). This indicated the most of the respondents expressed their agreement with the items statement under human resources. The highest score was HR2 (5.07) which encourage the employees to solve the problem.

Table 5.53
Descriptive Analysis of Items in Human Resources

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
HR1	4.79	.925	91
HR2	5.07	.892	91
HR3	5.02	.843	91
HR5	4.73	.883	91

5.9.3 Descriptive Analysis of Supplier Management

Table 5.54 illustrates descriptive analysis of mean value of the supplier management of quality management practices. The result indicated that mean value was (5.09). This shown that the most of the respondents expressed their agreement with statement under supplier management.

Table 5.54

Descriptive Analysis of Supplier Management

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
Supplier Management	5.09	.664	91

Table 5.55 indicated the characteristics result of supplier management of quality management practices. The results indicated that mean value fall between (4.76) to (5.44). This indicated the most of the respondents expressed their agreement with the items statement under supplier management. The highest score was SM1 (5.44) which organization have supplier selection criteria (e.g. quality, cost, financial, service, technical and delivery).

Table 5.55

Descriptive Analysis of Items in Supplier Management

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
SM1	5.44	.733	91
SM3	5.27	.804	91
SM4	4.89	.862	91
SM5	5.09	.825	91
SM6	4.76	.981	91

5.9.4 Descriptive Analysis of Customer Focus

Table 5.56 indicates the descriptive analysis of mean value of the customer focus of quality management practices. The results indicated mean

value was (5.47). This indicated the most of respondents expresses their agreement with all statement under customer focus.

Table 5.56
Descriptive Analysis of Customer Focus

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
Customer Focus	5.47	.491	91

Table 5.57 indicates the characteristics result of customer focus of quality management practices. The results indicated that mean value fall between (5.38) to (5.60). This indicated the most of the respondents expressed their agreement with the items statement under customer focus. The highest score was CF2 (5.60) which business objective concern about customer satisfaction.

Table 5.57
Descriptive Analysis of Items in Customer Focus

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
CF1	5.54	.583	91
CF2	5.60	.575	91
CF3	5.38	.663	91
CF4	5.38	.727	91

5.9.5 Descriptive Analysis of Process Approach

Table 5.58 indicates the descriptive analysis of mean value of the process approach of quality management practices. The results indicated

mean value was (5.05). This indicated the most of respondents expresses their agreement with all statement under process approach.

Table 5.58
Descriptive Analysis of Process Approach

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
Process Approach	5.05	.702	91

Table 5.59 indicates the characteristics result of process approach of quality management practices. The results indicated that mean value fall between (4.95) to (5.21). This indicated the most of the respondents expressed their agreement with the items statement under process approach. The highest score was PA2 (5.21) which have preventive maintenance schedule.

Table 5.59
Descriptive Analysis of Items in Process Approach

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
PA1	4.95	.736	91
PA2	5.21	.863	91
PA3	5.11	.875	91
PA4	5.00	.803	91
PA5	5.03	.888	91

5.9.6 Descriptive Analysis of Design Products

Table 5.60 indicates the descriptive analysis of mean value of the designs of product of quality management practices. The results indicated

mean value was (4.92). This indicated the most of respondents expresses their agreement with all statement under design of product.

Table 5.60
Descriptive Analysis of Design of Product

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
Design of Product	4.92	.785	91

Table 5.61 indicates the characteristics result of design of products of quality management practices. The results indicated that mean value fall between (4.68) to (5.18). This indicated the most of the respondents expressed their agreement with the items statement under design of products. The highest score was DP2 (5.18) which work in team, with member from other department (e.g. sales, marketing) in product design.

Table 5.61
Descriptive Analysis of Items in Design of Products

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
DP2	5.18	.811	91
DP3	4.68	1.074	91
DP4	5.11	.912	91
DP5	4.75	1.050	91

5.9.7 Descriptive Analysis of Strategy Planning

Table 5.62 indicates the descriptive analysis of mean value of the strategy planning of quality management practices. The results indicated

mean value was (4.97). This indicated the most of respondents expresses their agreement with all statement under design of product.

Table 5.62
Descriptive Analysis of Strategy Planning

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
Strategy Planning	4.97	.747	91

Table 5.63 indicates the characteristics result of strategy planning of quality management practices. The results indicated that mean value fall between (4.85) to (5.04). This indicated the most of the respondents expressed their agreement with the items statement under strategy planning. The highest score was SP1 (5.04) which acknowledge company strategic plan to all staff (e.g. company mission, vision and etc.).

Table 5.63
Descriptive Analysis of Items in Strategy Planning

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
SP1	5.04	.868	91
SP2	5.02	.977	91
SP3	4.85	.881	91
SP4	4.97	.823	91
SP5	4.99	.810	91

5.9.8 Descriptive Analysis of Information Analysis

Table 5.64 indicates the descriptive analysis of mean value of the information analysis of quality management practices. The results indicated

mean value was (4.92). This indicated the most of respondents expresses their agreement with all statement under information analysis.

Table 5.64
Descriptive Analysis of Information Analysis

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
Information Analysis	4.92	.767	91

Table 5.65 indicates the characteristics result of information analysis of quality management practices. The results indicated that mean value fall between (4.79) to (5.05). This indicated the most of the respondents expressed their agreement with the items statement under information analysis. The highest score was IA1 (5.05) which the company analyze all data (e.g. defect rates, scrap, rework and etc.).

Table 5.65
Descriptive Analysis of Items in Information Analysis

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
IA1	5.05	.899	91
IA2	4.96	.893	91
IA3	4.79	.888	91
IA4	4.86	.851	91
IA5	4.99	.876	91

5.9.9 Descriptive Analysis of Continuous Improvement

Table 5.66 indicates the descriptive analysis of mean value of the continuous improvement of quality management practices. The results

indicated mean value was (4.90). This indicated the most of respondents expresses their agreement with all statement under continuous improvement.

Table 5.66
Descriptive Analysis of Continuous Improvement

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
Continuous Improvement	4.90	.812	91

Table 5.67 indicates the characteristics result of continuous improvement of quality management practices. The results indicated that mean value fall between (4.77) to (5.04). This indicated the most of the respondents expressed their agreement with the items statement under continuous improvement. The highest score was CI1 (5.04) which company are use plan-do-check-action cycle extensively for continuous improvement.

Table 5.67
Descriptive Analysis of Items in Continuous Improvement

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
CI1	5.04	.918	91
CI2	4.80	.833	91
CI3	4.77	1.065	91
CI4	4.88	.953	91
CI5	5.02	.894	91

5.9.10 Descriptive Analysis of Economic of SPD

Table 5.68 illustrates the descriptive analysis of mean value of the economic of sustainable product development. The results indicated mean value was (4.59). This shows that most of respondents express their

agreement with all statement under economic of sustainable product development.

Table 5.68
Descriptive Analysis of Economic of SPD

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
Economic of SPD	4.59	.775	91

Note: SPD (Sustainable Product Development).

Table 5.69 indicates the characteristics result of economical of sustainable product development. The results indicated that mean value fall between (4.44) to (4.77). This indicated the most of the respondents expressed their agreement with the items statement under economical of sustainable product development. The highest score was EC3 (4.77) which company take positive step to improve economics product design of SPD.

Table 5.69
Descriptive Analysis of Items in Economic of SPD

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
EC1	4.44	1.002	91
EC2	4.58	.895	91
EC3	4.77	.790	91
EC4	4.57	1.024	91

5.9.11 Descriptive Analysis of Environment of SPD

Table 5.70 illustrates the descriptive analysis of mean value of the environment of sustainable product development. The results indicated mean value was (5.06). This shows that most of respondents express their

agreement with all statement under environment of sustainable product development.

Table 5.70
Descriptive Analysis of Environment of SPD

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
Environment of SPD	5.06	.779	91

Note: SPD (Sustainable Product Development)

Table 5.71 indicates the characteristics result of environment of sustainable product development. The results indicated that mean value fall between (4.98) to (5.24). This indicated the most of the respondents expressed their agreement with the items statement under environment of sustainable product development. The highest score was EN1 (5.24) which company use non hazardous materials on products.

Table 5.71
Descriptive Analysis of Items in Environment

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
EN1	5.24	.981	91
EN2	5.10	.932	91
EN3	4.98	.882	91
EN4	5.02	.931	91
EN5	4.98	.894	91

5.9.12 Descriptive Analysis of Society of SPD

Table 5.72 illustrates the descriptive analysis of mean value of the society of sustainable product development. The results indicated mean value was (4.82). This shows that most of respondents express their

agreement with all statement under environmental of sustainable product development.

Table 5.72
Descriptive Analysis of Society of SPD

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
Society of SPD	4.82	.873	91

SPD: Sustainable Product Development

Table 5.73 indicates the characteristics result of societal of sustainable product development. The results indicated that mean value fall between (4.75) to (4.95). This indicated the most of the respondents expressed their agreement with the items statement under societal of sustainable product development. The highest score was SC5 (4.95) which company inform timely to society that may effect by conditions of products (e.g. health, safety and environment).

Table 5.73
Descriptive Analysis of Items in Societal

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
SC1	4.79	1.006	91
SC2	4.82	1.028	91
SC3	4.75	1.111	91
SC5	4.95	.982	91

5.9.13 Descriptive Analysis of Financial

Table 5.74 illustrates the descriptive analysis of mean value financial of the organizational performance. The results indicated mean value was

(4.67). This shows that most of respondents express their agreement with all statement under financial of organizational performance.

Table 5.74
Descriptive Analysis of Financial

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
Financial	4.67	.777	91

Table 5.75 indicates the characteristics result of financial of organizational performance. The results indicated that mean value fall between (4.59) to (4.84). This indicated the most of the respondents expressed their agreement with the items statement under financial of organizational performance. The highest score was FP3 (4.84) which improved cost reduction of company.

Table 5.75
Descriptive Analysis of Items in Financial

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
FP1	4.59	.954	91
FP2	4.66	.909	91
FP3	4.84	.793	91
FP4	4.65	.887	91
FP5	4.73	.895	91
FP6	4.62	.928	91

5.9.14 Descriptive Analysis of Non-Financial

Table 5.76 illustrates the descriptive analysis of mean value non-financial of the organizational performance. The results indicated mean value was (4.72). This shows that most of respondents express their agreement with all statement under financial of organizational performance.

Table 5.76
Descriptive Analysis of Non-Financial

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
Non-Financial	4.72	.724	91

Table 5.77 indicates the characteristics result of non-financial of organizational performance. The results indicated that mean value fall between (4.54) to (4.92). This indicated the most of the respondents expressed their agreement with the items statement under non-financial of non-organizational performance. The highest score was NF2 (4.92) which improved customer satisfaction.

Table 5.77
Descriptive Analysis of Items in Non-Financial

Variables	Mean (M)	Standard Deviation (SD)	N(Total)
NF1	4.86	.877	91
NF2	4.92	.806	91
NF3	4.80	.819	91
NF4	4.80	.792	91
NF5	4.58	.857	91
NF6	4.54	.958	91
NF7	4.66	1.035	91
NF8	4.65	.923	91
NF9	4.68	.917	91
NF10	4.76	.835	91

5.9.15 Summary of Descriptive Analysis

Table 5.48 illustrates that quality management practices of higher score of mean is customer focus (5.47), leadership (5.26), and supplier management (5.09). That mean automotive industry in Malaysia mostly agreed that customer focus, leadership, and supplier management have played important role in their organizational performance. Meanwhile, in sustainable product development of higher score of mean is environment (5.06), social (4.82), and economic (4.59). The results reflect the respondents agreement environment in automotive sector have played important role for organizational sustainability. In next section, the researcher will discuss the normality, linearity.

5.10 Precondition Test

In this section, researcher will discuss the normality and linearity of data collected. The purpose of this study is to ensure data collected should be distributed equally and have linear correlation within the variables. The following precondition test will be discussed.

5.10.1 Normality Test

According to Tabachnick and Fidell (2007) the normality of variables is assessed by either are statistical or graphical methods. Statistical methods commonly are using skewness and kurtosis analysis. Previous section is

explained in detailed the skewness and kurtosis result were shown that data distributed in normal condition. In addition, this section researcher explained the normality of data by using the graphical method. As suggested by Graveter and Wallnau (2009) the graphical method is normal when is symmetrical, bell-shaped curve, which has the greatest frequency of scores in the middle and with smaller frequencies towards the extremes. Figure 5.1 illustrated the residual graph of quality management practices and organizational performance.

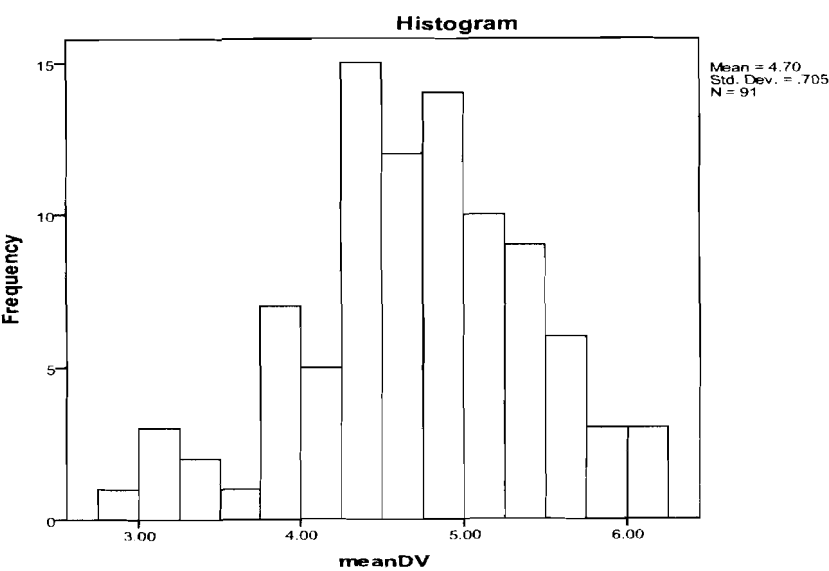


Figure 5.1
The histogram for normal distributed

5.10.2 Linearity and Homogeneity Test

Linearity is the second assumption for normality of data. According to Tabachnick and Fidell (2007) defined that linearity as the degree of how the

relationship between the variables can be described in a straight line. Figure 5.2 were shown the linearity residual plots.

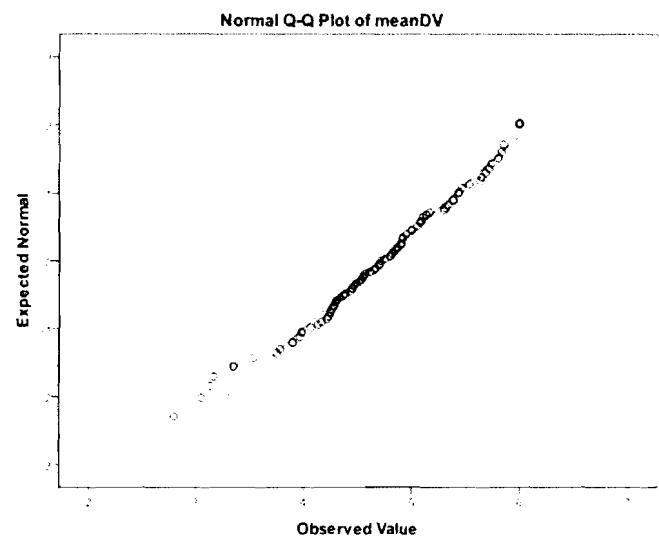


Figure 5.2
The normal P-P Plot
 The homoscedasticity appears when the values of the variance for dependent variables concentrate in only a limit range of the independent variables (Hair *et al.*, 2007). Figure 5.3 were illustrated the assumption of homoscedasticity.

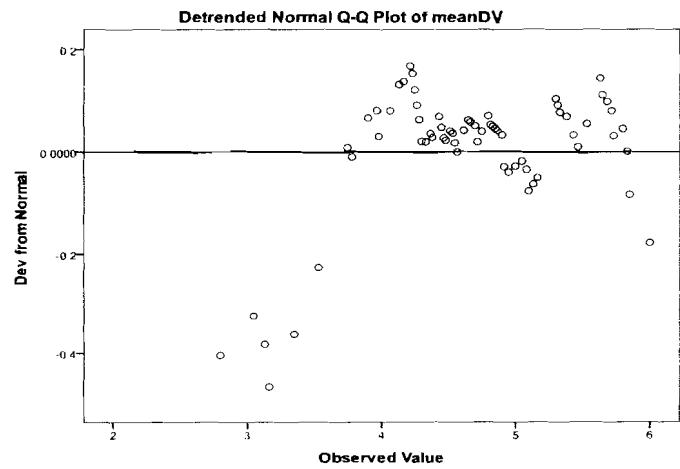


Figure 5.3
The scatterplot

5.10.3 Multivariate Outlier

In preliminary analysis, it is important to separate legitimate outliers from errors in measurement, editing, coding, and data entry. Outlier could be effected the regression test and should be corrected or removed (Copper & Schindlar, 1998). In statistical method the multivariate outlier can be detected through standardized residual value in scatterplot. According to Tabachnick and Fidell (2007); Pallant (2005) the tolerance of outlier is ± 3.3 Table 5.78 were illustrated the statistical residual value.

Table 5.78
Statistical Residual

	Min	Max	Mean	Std Dev.	N
Predicted Value	3.52	5.41	4.70	.452	91
Residual	-1.90	1.05	.000	.553	91
Std. Predicted Value	-2.71	1.63	.000	1.00	91
Std. Residual	-3.20	1.89	.000	.994	91

a. Variables: *Organizational Performance*.

5.10.4 Multicollinearity Test

Tabachnick and Fidell (2007) described the multicollinearity can be recognized if there highly correlated between the variables. For this study, multicollinearity within variables is conducted by identifying by VIF values and tolerance test. According to Hair *et al*, (2010) the maximum value for VIF should not more than 10 and tolerance not less than 0.1 Thus, in this study, the independent variables were scrutinized for determining the existence of multicollinearity.

Table 5.79
Testing of Multicollinearity

Variables	Tolerance	VIF
Leadership	.351	2.845
Human Resources	.456	2.191
Supplier Management	.293	3.408
Customer Focus	.532	1.881
Process Approach	.229	4.373
Design of Product	.343	2.914
Strategy Planning	.299	3.349
Information Analysis	.295	3.392
Continuous Improvement	.294	3.396
Economic of SPD	.480	2.084
Environment of SPD	.416	2.406
Society of SPD	.502	1.993

Dependent Variable: Organizational Performance

From Table 5.79 it can be seen that the largest VIF among the variables is 4.373, which is lower than the maximum value (VIF=10) were suggested by Hair *et al.* (2010). Table 5.79 also shown that there was no multicollinearity problems were exists in variables. There it is possible to proceed for multiple regression analysis.

5.11 Hypothesis Test

As it is explained in previous chapter, the research hypotheses tests were conducted when precondition test for correlation and regression test are fulfilled. In this study, there are four hypotheses development. A first hypothesis is positive relationship of QM practices and organizational performance. Second hypothesis is QM practices have and effect on organizational performance. Third hypothesis is mediating effect of sustainable product development in between QM practices and organizational performance and fourth hypothesis is moderating effect of

organization characteristics between QM practices and organizational performance. Generally, the relationship test is used Pearson correlation, multiple regression analysis is to determine the effect of strength among variables and hierarchical multiple regression analysis test is for mediating and moderating effect.

Table 5.80
Summary of Research Hypotheses Test H1, H2, H3 and H4.

Hypotheses	Statement of Hypotheses
H1	The QM practices have positive relationship with OP.
H1-1	The leadership of QM practices has positive relationship with OP.
H1-2	The human resources management of QM practices has positive relationship with OP.
H1-3	The supplier management of QM practices has positive relationship with OP.
H1-4	The customer focus of QM practices has positive relationship with OP.
H1-5	The process approach of QM practices has positive relationship with OP.
H1-6	The design of product of QM practices has positive relationship OP.
H1-7	The strategic planning of QM practices has positive relationship with OP.
H1-8	The information analysis of QM practices has positive relationship with OP.
H1-9	The continuous improvement of QM practices has positive relationship with OP.
H2	The QM practices has effect on OP.
H2-1	The leadership of QM practices has effect on OP.
H2-2	The human resources management of QM practices has effect on OP.

Note: QM (Quality Management), OP (Organization Performance).

Table 5.80 (Continued)

Summary of Research Hypotheses Test H1, H2, H3 and H4.

Hypotheses	Statement of Hypotheses
H2-3	The supplier management of QM practices has effect on OP.
H2-4	The customer focus of QM practices has effect on OP.
H2-5	The process approach of QM practices has effect on OP.
H2-6	The design of product of QM practices has effect on OP.
H2-7	The strategic planning of QM practices has effect on OP.
H2-8	The information analysis of QM practices has effect on OP.
H2-9	The continuous improvement of QM practices has effect on OP.
H3	The influence of QM practices on OP is mediated by SPD.
H4	The influence of QM practices on OP is moderated by OC.

Note: QM (Quality Management), OP (Organizational Performance), SPD (Sustainable Product Development), OC (Organizational Characteristics).

5.11.1 Pearson Correlation Test

The Pearson correlation test is magnitude and direction of variables (Copper & Schindler, 1998). Pallant (2005) argued that value of Pearson correlation varies over range of ± 1 , and 0, while (+) sign indicated the positive perfection and (-) sign indicated negative perfection. Table 5.81 illustrated the values of Pearson correlation.

Table 5.81
Pearson Correlation values by Cohen (1988)

Description	Value of “r”
Weak	.10 to .29
Medium	.30 to .49
Strong	.50 to 1.00

In this study, the Pearson correlation tests were conducted into three variables and relationship between QM practices and organizational performance. Table 5.82 were illustrated the result of Pearson correlation test.

Table 5.82
Pearson Correlation Test Result

Variables	Organizational Performance
Quality Management Practices	.618**
Sustainable Product Development	.668**

*** Correlation is significant at the 0.01 level (2-tailed).*

Pearson product-moment correlation coefficient method was used to investigate the relationship between QM practices and organizational performance. Preliminary test was performed to ensure there are normality, linearity and homoscedasticity. The result was illustrated that there are strong, positive correlation between the quality management practices and organizational performance (r = .618, n = 91, p < 0.01).

5.11.2 Multiple Regression Test

Multiple regression analysis is a set of statistical procedures used to predict and explain the value of dependent variable based on the value of one or more independent variables. Least squares method is used to estimate the slope and the intercept on y-axis of the regression line. The coefficient of determination (R^2) is used to investigate the contribution of an independent variable on the variance of the dependent variable. There outlier have been identified and data does not violate the assumption of normality, homoscedasticity, linearity and independence. In Table 5.83 was illustrated the result of regression test all variable used in this research. Result was illustrated that quality management practices and organizational performance is significant ($R^2 = 0.442$, Sig. 0.000), sustainable product development and organizational performance also significant ($R^2 = 0.473$, Sig 0.000) and quality management practices and sustainable product development is significant ($R^2 = 0.637$, Sig. 0.000).

Table 5.83
Multiple Regression Test Result (R Square)

Variables	Organizational Performance	Sustainable Product Development
QMP	.442 (Sig. 0.000)	.637 (Sig. 0.000)
SPD	.473 (Sig. 0.000)	-

5.11.3 Result Analysis of Hypothesis H1, H1-1 to H1-9

Research objective of hypotheses H1 is to examine the relationship between QM practices and organizational performance. In Table 5.84 was

illustrated that the Pearson correlation results of quality management practices and organizational performance (H1) and each dimension of QM practices and organizational performance (H1-1 to H1-9).

Table 5.84
Research Objective, Hypothesis, and Statistical Analysis of H1 and H1-1 to H1-9

Research Objective	Hypothesis	Statistical Analysis
To examine the relationship between QMP and OP.	H1: The QMP have positive relationship with OP.	Pearson Correlation ($r = 0.618^{**}$)
To examine the relationship of leadership in QMP on OP	H1-1: The QMP of leadership have positive relationship on OP.	Pearson Correlation ($r = 0.408^{**}$)
To examine the relationship of human resource in QMP on OP	H1-2: The QMP of human resource have positive relationship on OP	Pearson Correlation ($r = 0.362^{**}$)
To examine the relationship of supplier management resource in QMP on OP.	H1-3: The QMP of supplier management have positive relationship on OP.	Pearson Correlation ($r = 0.481^{**}$)
To examine the relationship of customer focus in QMP on OP	H1-4: The QMP of customer focus have positive relationship on OP.	Pearson Correlation ($r = 0.462^{**}$)
To examine the relationship of process approach in QMP on OP.	H1-5: The QMP of process approach have positive relationship on OP.	Pearson Correlation ($r = 0.534^{**}$)
To examine the relationship of product design in QMP on OP	H1-6: The QMP of product design have positive relationship on OP.	Pearson Correlation ($r = 0.566^{**}$)
To examine the relationship of strategic planning in QMP on OP	H1-7: The QMP of strategic planning have positive relationship on OP.	Pearson Correlation ($r = 0.505^{**}$)

Table 5.84 (Continued)

Research Objective, Hypothesis, and Statistical Analysis of H1 and H1-1 to H1-9

Research Objective	Hypothesis	Statistical Analysis
To examine the relationship of information analysis in QMP on OP.	H1-8: The QMP of information analysis have positive relationship on OP.	Pearson Correlation ($r = 0.566^{**}$)
To examine the relationship of continuous improvement in QMP on OP.	H1-9: The QMP of continuous improvement have positive relationship on OP.	Pearson Correlation ($r = 0.614^{**}$)

In Table 5.85 illustrated the result of H1, H1-1 to H1-9 which indicated the strong and medium acceptance of Pearson correlation magnitude.

Table 5.85

Summary of Pearson Correlation Magnitude and Strength (H1, H1-1 to H1-9)

Hypothesis	Pearson Correlation Result	Result
H1	$r = 0.618^{**}$	Strong (accepted)
H1-1	$r = 0.408^{**}$	Medium (accepted)
H1-2	$r = 0.362^{**}$	Medium (accepted)
H1-3	$r = 0.481^{**}$	Medium (accepted)
H1-4	$r = 0.462^{**}$	Medium (accepted)
H1-5	$r = 0.534^{**}$	Strong (accepted)
H1-6	$r = 0.566^{**}$	Strong (accepted)
H1-7	$r = 0.505^{**}$	Strong (accepted)
H1-8	$r = 0.566^{**}$	Strong (accepted)
H1-9	$r = 0.614^{**}$	Strong (accepted)

***Correlation is significant at the 0.01 level (2-tailed)*

5.11.4 Result Analysis of Hypothesis H2, H2-1 to H2-9

Research objective of hypotheses H2 is to examine the effect of quality management on organizational performance. Meanwhile H2-1 to H2-9 is to examine the each dimension of QM practices have effect on organizational performance. As reason, multiple regression analysis was used in this test to predict and explain the value of QM practices on organizational performance which are linearly correlated (Pallant, 2007). In Table 5.86 illustrated the result of hypothesis H2, H2-1 to H2-9.

Table 5.86
Summary of Multiple Regressions (H2, H2-1 to H2-9)

Hypothesis	Multiple Regression Result	Result
H2	($R^2 = 0.442$, $p = 0.000$)	Accepted
H2-1	($\beta = -0.129$, $t = -0.824$, $p = 0.412$)	Not accepted
H2-2	($\beta = 0.014$, $t = 0.112$, $p = 0.911$)	Not accepted
H2-3	($\beta = 0.186$, $t = 1.142$, $p = 0.257$)	Not accepted
H2-4	($\beta = 0.160$, $t = 0.980$, $p = 0.330$)	Not accepted
H2-5	($\beta = -0.062$, $t = -0.356$, $p = 0.723$)	Not accepted
H2-6	($\beta = 0.158$, $t = 1.240$, $p = 0.218$)	Not accepted
H2-7	($\beta = -0.101$, $t = -0.706$, $p = 0.482$)	Not accepted
H2-8	($\beta = 0.155$, $t = 1.105$, $p = 0.272$)	Not accepted
H2-9	($\beta = 0.339$, $t = 2.553$, $p = 0.013$)	Accepted

5.11.4.1 Multiple Regression Tests between QM Practices and Organizational Performance

In Table 5.87 shown the value of $R^2 = .442$ was indicated that the QM practices, namely leadership, human resources management, supplier management, customer focus, process approach, design of products, strategic planning, information analysis, and continuous improvement explained 44.2% the variance of organizational performance. Another indicator in multiple regressions is adjusted R^2 value. Pallant (2007) claimed that the adjusted R^2 value statistic provide a better estimate of the true population value. In this study, the adjusted R^2 value was .380 with significant at level .000.

Table 5.87

Multiple Regression Test (Quality Management Practices and Organizational Performance)

R	R²	Adjusted R²	Std. Error of the Estimate	F	Sig.
.665	.442	.380	.55502	7.117	.000

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	SE_B	β			Tolerance	VIF
Constant	1.104	.680		1.623	.108		
LS	-.129	.156	-.115	-.824	.412	.351	2.845
HRM	.014	.124	.014	.112	.911	.456	2.191
SM	.186	.163	.175	1.142	.257	.293	3.408
CF	.160	.163	.112	.980	.330	.532	1.881
PA	-.062	.174	-.062	-.356	.723	.229	4.373
DP	.158	.127	.176	1.240	.218	.343	2.914
SP	-.101	.143	-.107	-.706	.482	.299	3.349
IA	.155	.140	.169	1.105	.272	.295	3.392
CI	.339	.133	.391	2.553	.013	.294	3.396

Note: *LS(Leadership)*, *HRM(Human resource management)*, *SM(Supplier management)*, *CF(Customer focus)*, *PA(Process approach)*, *DP(Design of product)*, *SP(Strategic planning)*, *IA(Information analysis)*, *CI(Continuous improvement)*.

In Table 5.87 have explained at the significance level, $\alpha = .05$ (5%) or confidence level (95%). The regression equation which is used to estimate the organizational performance is as follows:

$$\text{QMP} = 1.104 + (-.129) \text{LS} + (0.014) \text{HRM} + (0.186) \text{SM} + (0.160) \text{CF} + (-0.062) \text{PA} + (0.158) \text{DP} + (-0.101) \text{SP} + (0.155) \text{IA} + (0.339) \text{CI}.$$

The equation have explained that the constant value of was (1.104). The highest coefficients regression is continuous improvement, which have positive value and could increase the organizational performance up to 33.9%. In Table 5.87 was illustrated that continuous improvement (H2-9) ($\beta = 0.339$, $t = 2.553$, $p = 0.013$). It indicated that continuous improvement is important agenda of quality management practices in automotive industry. However, the dimensions of quality management practices are namely leadership, human resources management, customer focus, process approach, product design and strategic planning are not significance on organizational performance. It could be reason that the market product demand at maturated level and lack of multiple choice model in Malaysian automotive industry. This finding is similar to Osman, Ali, Rashid, & Jusoff (2009) stressed that continuous improvement one of key success in Malaysian automotive industry.

Table 5.88

Research Objective, Hypothesis, and Statistical Analysis of H2 and H2-1 to H2-9

Research Objective	Hypothesis	Statistical Analysis
To examine the effect of QMP on OP	H2: The QMP have effect on OP	Multiple Regression
To examine the effect of leadership in QMP on OP	H2-1: The QMP of leadership have effect on OP	Multiple Regression
To examine the effect of human resource in QMP on OP.	H2-2: The QMP of human resource have effect on OP	Multiple Regression
To examine the effect of supplier management resource in QMP on OP	H2-3: The QMP of supplier management have effect on OP	Multiple Regression
To examine the effect of customer focus in QMP on OP	H2-4: The QMP of customer focus have effect on OP	Multiple Regression
To examine the effect of process approach in QMP on OP	H2-5: The QMP of process approach have effect on OP	Multiple Regression
To examine the effect of product design in QMP on OP	H2-6: The QMP of product design have effect on OP	Multiple Regression
To examine the effect of strategic planning in QMP on OP	H2-7: The QMP of strategic planning have effect on OP	Multiple Regression
To examine the effect of information analysis in QMP on OP	H2-8: The QMP of information analysis have effect on OP	Multiple Regression
To examine the of effect continuous improvement in QMP on OP	H2-9: The QMP of continuous improvement have effect on OP	Multiple Regression

5.12 Result Analysis of Hypothesis H3

Research objective of hypothesis H3 is to investigate the influences of sustainable product development in relationship between QM practices and organizational performance. Table 5.89 explained the hypotheses explanation, research question and research objective.

Table 5.89
Hypothesis H3

Hypothesis	Explanation	Research Question	Research Objective
H3	The influence of QMP and OP is mediated by SPD.	What is mediating role of SPD can influence QMP on OP?	To investigate the mediating effect of SPD on QMP and OP.

QMP: Quality Management Practices, SPD: Sustainable Product Development, OP: Organizational Performance

Table 5.89 shows the hypothesis explanation of the influence of QM practices and organizational performance is mediated by sustainable product development. Research question is to determine the mediating role of sustainable product development can influence the relationship between QM practices and organizational performance. Research objective is to investigate the mediating effect of sustainable product development on the relationship between QM practices and organizational performance. The next hierarchical multiple regression test will present the result of influences sustainable product development in relationship with QM practices and organizational performance.

Table 5.90 were indicated the statistical analysis of hierarchical multiple regression and Sobel test will use to investigate the mediating effect of sustainable product development on the relationship between QM practices and organizational performance.

Table 5.90
Summary of Statistical Analysis of H3

Research Objective	Hypotheses	Statistical Analysis
To investigate the mediating effect of SPD on QMP and OP.	H3	Hierarchical Multiple Regression and Sobel Test

QMP: Quality Management Practices, SPD: Sustainable Product Development
OP: Organizational Performance.

5.12.1 Hierarchical Multiple Regression Test of Mediating Variable.

The mediating effect of sustainable product development on the relationship between QM practices and organizational performance, the hierarchical multiple regression and Sobel test was conducted. In this study, the mediating variables are sustainable product development, independent variables are quality management practices and dependent variables are organizational performance.

According to Baron and Kenny (1986), there were three steps in hierarchical multiple regressions analysis, in details as follows;

1. Examine the relationship between independent variables (X) and mediating variables (M),

$$M = B_3 + aX + e_3 \dots\dots\dots (1)$$
2. Examine the relationship between independent variables (X) and dependent variables (Y),

$$Y = B_1 + cX + e_1 \dots\dots\dots (2)$$

3. Examine the relationship of independent variables (X), dependent variables (Y), and mediating variables (M),

$$Y = B_2 + c'X + bM + e_2 \dots\dots\dots (3)$$

Whereas:

Baron and Kenny (1986) also described mediating effect are fulfilled if following requirement are meet during testing.

1. If value (a) in equation (1) is significant, there are linear relationship between independent variables and mediating variables.
2. If value (c) in equation (2) is significant, it shown there are linear relationship between independent variables and dependent variables.
3. If value (b) in equation (3) is significant, it shown there are predicted that mediating variables influence the dependent variables.
4. The value (c') in equation (3) should be smaller than value (c) in equation (2).

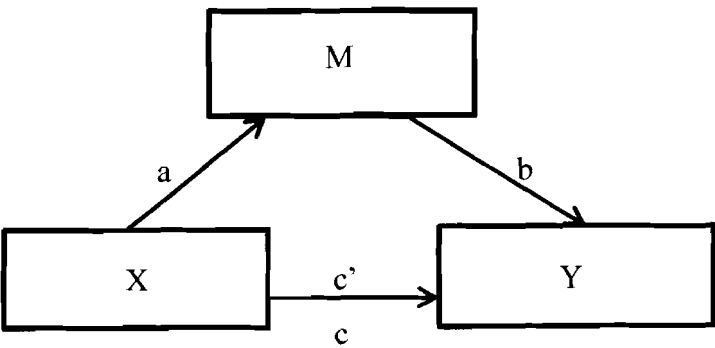


Figure 5.4
Graphic for Hierarchical Multiple Regression

The category of mediating can be described as following:

1. **Full Mediation** happens when equation (3) is not significant with dependent variables when mediating variables is controlled (Judd & Kenny, 1981).
2. **Partial Mediation** happens when independent variables in equation (3) have significant with dependent variables when mediating variables is controlled (Baron & Kenny, 1986).
3. **Zero Mediation** happens when value (a) or (b) is not significant. Independent variables have directly relationship with dependent variables.

5.12.2 Hierarchical Multiple Regression between QM Practices and Sustainable Product Development

Table 5.91 explained hierarchical multiple regression requirement analysis between quality management practices and sustainable product development. In Table 5.92 illustrated the result of hierarchical multiple regression test in relationship with quality management practices and sustainable product development. The result of ($\beta = .767$, $p < 0.01$) it shown that there are meet requirement of equation (1), there are significant relationship between quality management practices as independent variables and sustainable product development as mediating variables.

Table 5.91

Hierarchical Multiple Regression Test (In relation with QMP and SPD).

Step 1	Unstandardized Coefficients		Standardized Coefficients	t	P
	B	Std. Error	β		
M: SPD	.949	.084	.767	11.27	.000
X : QMP					
R²	.588				
Adjusted R²	.583				
F	127.055				
Sig. F Change	.000				

Note: SPD (Sustainable Product Development), QMP (Quality Management Practices)

5.12.3 Hierarchical Multiple Regression between Sustainable Product Development and Organizational Performance

Table 5.92 explained the hierarchical multiple regression analysis between sustainable product development and organizational performance. In Table 5.92 illustrated the result of hierarchical multiple regression test in relationship with sustainable product development and organizational performance. The result of ($\beta = .668$, $p < 0.01$) it shown that there are meet requirement of equation (3), there are significant relationship between sustainable product development as mediating variables and organizational performance as dependent variable.

Table 5.92

Hierarchical Multiple Regression Test (In relation with SPD and OP).

Step 1	Unstandardized Coefficients		Standardized Coefficients	t	P
	B	Std. Error	β		
M: SPD Y : OP	.664	.078	.668	8.468	.000
R ²	.446				
Adjusted R ²	.440				
F	71.701				
Sig. F Change	.000				

Note: SPD (Sustainable Product Development), OP (Organizational Performance)

5.12.4 Hierarchical Multiple Regression between QM Practices and Organizational Performance

Table 5.93 explained hierarchical multiple regression analysis between quality management practices and organizational performance. In Table 5.93 illustrated the result of hierarchical multiple regression test (in relationship with QM practices and organizational performance. The result of ($\beta = .618$, $p < 0.01$) it shown that there are meet requirement of equation (2), there are significant relationship between QM practices as independent variables and organizational performance as dependent variables.

Table 5.93
Hierarchical Multiple Regression Test (In relation with QMP and OP).

Step 1	Unstandardized Coefficients		Standardized Coefficients	t	P
	B	Std. Error	β		
Y : OP X : QMP	.760	.102	.618	7.421	.000
R ²	.382				
Adjusted R ²	.375				
F	55.075				
Sig. F Change	.000				

Note: OP (Organizational Performance), QMP (Quality Management Practices).

5.12.5 Hierarchical Multiple Regression between QM Practices, Sustainable Product Development and Organizational Performance

Table 5.94 explained hierarchical multiple regression analysis between QM practices, sustainable product development and organizational performance. In Table 5.94 illustrated ($\beta = .471$, $p < 0.01$) that indicated sustainable product development have significant relationship with organizational performance, there were meet with equation (3). The result $\beta = .257$ of independent variables must lower than ($\beta = .618$) of independent variables that indicated equation (4) are fulfilled

Table 5.94

Hierarchical Multiple Regression Test (In relation with QMP, SPD and OP).

Step 1	Unstandardized Coefficients		Standardized Coefficients	t	P
	B	Std. Error	β		
Y : OP					
X : QMP	.317	.148	.257	2.136	0.035
M : SPD	.468	.120	.471	3.904	0.000
R²	.473				
Adjusted R²	.462				
F	15.244				
Sig. F Change	.000				

Note: OP (Organizational Performance), QMP (Quality Management Practices), SPD (Sustainable Product Development).

Meanwhile, independent variables ($\beta = 0.257$, $p = 0.035$) is not significant and indicated that **Full Mediation** (Baron and Kenny, 1986). As result, the performance of organizational performance from $r^2 = .382$ or 38.2% have increased to $r^2 = .473$ or 47.3%. It shown mediating variable of sustainable product development has influenced 9.1 % in relationship between QM practices and organizational performance. In addition, the beta value is significant ($\beta = .471$, $t = 3.904$, $p = .000$) where indicated that sustainable product development played as mediating role which influenced the relationship between QM practices and organizational performance.

The calculation of effect size for mediator variable can be illustrated as bellows:-

$$\begin{aligned}
 \text{Eta Squared} &= (R_i^2 - R_m^2) / (1 - R_i^2) \\
 &= (0.473 - 0.382) / (1 - 0.473) \\
 &= 0.17
 \end{aligned}$$

Effect size result was 0.17 are considered small to medium effect (Cohen, 1988). Result also indicated that an eta squared 0.17 accounts for only 17% of the total variability in the dependent variable.

5.12.6 Summary of Hypothesis Result H3

Table 5.95 were illustrated the result of mediating effect in the relationship between QM practices and organizational performance.

Table 5.95
Summary Result of Mediated Variable

	Dependent Variables (OP)		Description
	Before Mediating	After Mediating	
QMP	.618**	.257	Full Mediation
SPD		.471**	

Note: OP (Organizational Performance), QMP (Quality Management Practices), SPD (Sustainable Product Development).

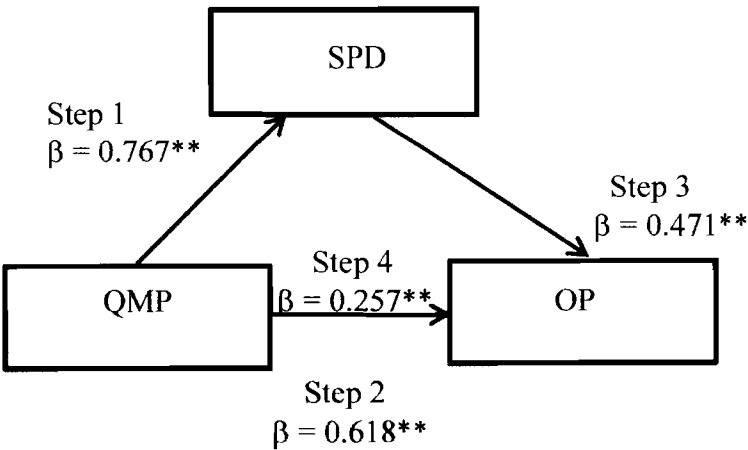


Figure 5.5
Summary of Hierarchical Multiple Regression Test Result (Mediating Variable)

Figure 5.5 illustrates the result of mediating variable in the relationship between QM practices and organizational performance. The first step of relationship quality management practices and sustainable product development ($\beta = 0.767, p < 0.01$) shown it is significant relationship. The second step of relationship QM practices and organizational performance ($\beta = 0.618, p < 0.01$) also shown there is significant relationship. The third step of relationship between sustainable product development and organizational performance ($\beta = 0.471, p < 0.01$) it shown the significant relationship. The final step of relationship quality management practices, sustainable product development and organizational performance ($\beta = 0.257, p < 0.01$) also shown the significant relationship. There is significance relationship of mediating role sustainable product development in relationship between QM practices and organizational performance when beta value was decreased from ($\beta = 0.618, p < 0.01$) to ($\beta = 0.257, p < 0.01$).

Table 5.96 was illustrated the Sobel test result, which performed a statistical test to see if the indirect path from the quality management practices to the organizational performance is statistically significantly different from zero (Preacher & Leonardelli, 2001). This is the same idea as the test providing support for partial mediation. The test statistic is equal to 6.798, with standard error 0.0926. The statistical significance is equal to ($p = 0.000$). We would conclude that the relationship between QM practices and organizational performance is mediated by sustainable product development.

Table 5.96
Sobel Test Result

Path	Values of Path	Test Statistic	Std. Error	p- Value
a	.767	7.116	.072	.000
b	.668			
Sa	.068			
Sb	.078			

Furthermore, according to Kenny *et al.* (1998) recommended that using MedGraph analysis can determine the existence of mediation variable. As reason, MedGraph-I version 2.0 was employed to assess the mediation of sustainable product development in the relationship between QM practices and organizational performance. A preliminary requirement for mediation test is statistically significant correlation relationships exist among the variables. To assess the significant of mediation, this study used Sobel's z statistic (Jose, 2003) as suggested by Preacher and Leonardelli (2001). The result in Table 5.100 was illustrated that Sobel's z statistic is statistically significant ($z = 7.114$, $p < .001$), indicating that a meaningful of sustainable product development was supported as mediating variable in the relationship between QM practices and organizational performance.

Table 5.97
Correlation of Variables

Variables	Sustainable Product Development	Organizational Performance
Quality Management Practices	0.767	0.618
Sustainable Product Development	-	0.668
Total Respondents	91	91

Table 5.97 (Continued)
Sobel's z-value Test Result

Test Result	
Sobel z-value : 7.114987, Sig. < 0.000001	
Standardize Coefficient of Quality Management Practices and Organizational Performance.	
Direct	0.471
Indirect	0.147

In Table 5.97 was shown that Sobel's z-value test result of indirect was (0.147) and direct was (0.471) which mean that sustainable product development act as mediator that carries the quality management practices influence towards the organizational performance.

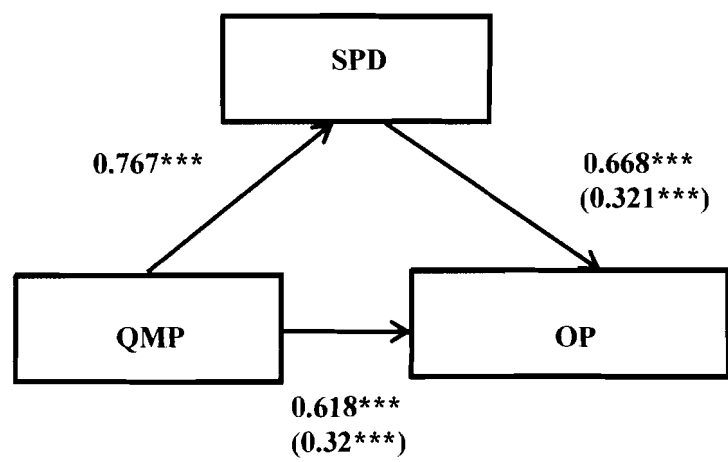


Figure 5.6
Summary of Sustainable Product Development as mediator in Sobel's z-value

Figure 5.6 indicates that the overall correlation in this study was exist a direct effect from the QM practices related to organizational performance ($r = 0.320$) and an indirect mediating effect that goes through the sustainable product development variable ($r = 0.298$).

In this study, the hypothesis of mediating influence of sustainable product development in the relationship between QM practices and organizational performance can be illustrated as Table 5.98.

Table 5.98
Result of Hypothesis H3

Hypothesis	Statement of Hypothesis	Result
H3	The influence of QM practices on OP is mediated by SPD.	Supported

Table 5.98 were illustrated the statement of hypothesis of the influence of QM practices on organizational performance is mediated by sustainable product development was supported.

5.13 Result Analysis of Hypothesis H4

Research objective of hypotheses H4 is to investigate the moderating effect of organization characteristics on QM practices and organizational performance. Table 5.99 explained the hypotheses explanation, research question and research objective.

Table 5.99
Hypothesis H4

Hypothesis	Explanation	Research Question	Research Objective
H4	The influence of QMP and OP is moderated by OC.	What is moderating role of OC can influence QMP and OP?	To investigate the moderating effect of OC on QMP and OP.

Table 5.99 shows the hypothesis explanation of the influence of QM practices and organizational performance is moderated by organization characteristics. Research question is to determine the moderating role of organization characteristics can influence the relationship between QM practices and organizational performance. Research objective is to investigate the moderating effect of organization characteristic on QM practices and organizational performance. The hierarchical multiple regressions are used to examine the influences of organizations characteristics on QM practices and organizational performance.

Table 5.100 indicates the statistical analysis of hierarchical multiple regression will use to investigate the moderating effect of organization characteristics on quality management practices and organizational performance.

Table 5.100
Summary of Statistical Analysis of H4

Research Objective	Hypotheses	Statistical Analysis
To investigate the moderating effect of OC on the relationship between QMP and OP.	H4	Hierarchical Multiple Regression
QMP: Quality Management Practices, OP: Organizational Performance, OC: Organization Characteristics.		

5.13.1 The Moderating Influence of Organization Characteristics in the Relationship between QM Practices and Organizational Performance.

In this section, the researcher will examine the moderating influence of organization characteristics (size of firms, ownership of firms, and length of time quality management practices adoption) in relation QM practices and organizational performance. In Table 5.101 were shown the result of testing.

Table 5.101

Summary of Hierarchical Multiple Regression Results of Moderating

	Std. Beta Model 1	Std. Beta Model 2	Std. Beta Model 3
Independent Variables			
Quality Management Practices	.618	-.597	.433
Moderating Variables			
Organization Characteristics	-	.026	-.129
Interaction Term			
Quality Management Practices X Organization Characteristics	-		.305
R ²	.382	.382	.383
Adjusted R ²	.375	.368	.362
R ² Change	.382	.000	.000
Sig. F Change	.000	.862	.809

In this study, the hierarchical multiple regression was conducted as recommended by Baron and Kenny (1986). They have recommend three step for hierarchical multiple regression analysis.

1. Independent variables was entered in model
2. Moderator variables was entered in model
3. Interaction of independent variables and moderator variables was entered in model

In summary, following result of hierarchical multiple regression analysis. The descriptive of finding as follows:

1. In step 1, when quality management practices was entered in equation the R² value was .382 that caused 38.2% of variance in organizational performance.
2. In step 2, when moderating variables was entered in equation the R² value was .382 or 38.2% caused the variance in organizational performance. There is no significant effect.

3. In step 3, the independent variables and moderating variables was entered simultaneously in equation, the R^2 value was increased to .383 or 38.3% caused variance in the organizational performance.

This study, the hypotheses of moderating influence by organization characteristics are categorized as **No Moderation** (Sharma *et al.*, 1981) as illustrated in Figure 5.7.

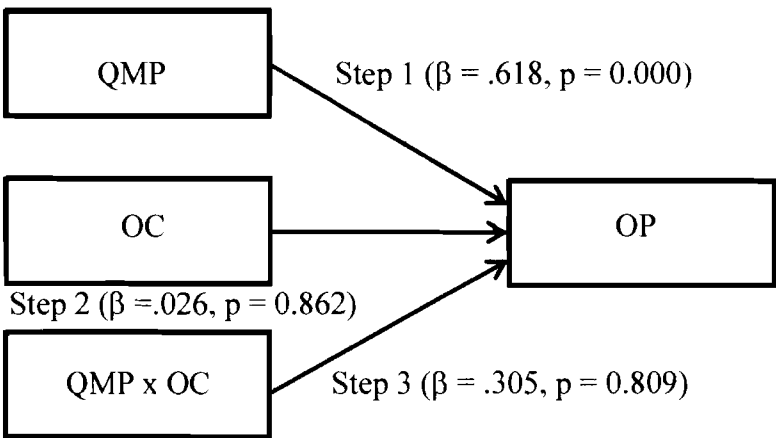


Figure 5.7
Summary of Hierarchical Multiple Regression Test Result (Moderating Variable)

The calculation of effect size for moderator can be illustrated as bellows:-

$$\begin{aligned} \text{Eta Square} &= (R_i^2 - R_m^2) / (1 - R_i^2) \\ &= (0.383 - 0.382) / (1 - 0.383) \\ &= 0.001 \end{aligned}$$

Effect size result was 0.001 are considered small effect (Cohen, 1988). Result indicated that an eta squared 0.001 accounts for only 0.1% of the total variability in the dependent variable.

5.13.2 Summary of Hypothesis Result H4

Table 5.102 illustrated the summary of hypothesis result based on finding.

Table 5.102
Result of Hypothesis H4

Hypothesis	Statement of Hypothesis	Result
H4	The influence of QM practices on OP is moderated by OC.	Not Supported

Figure 5.7 indicated that moderating effect of organization characteristics in relationship between QM practices and organizational performance. The first step of relationship QM practices and organizational performance were ($\beta = 0.618$, $p < 0.05$) is significant relationship. The second step of relationship organizational characteristics and organizational performance were ($\beta = 0.026$, $p < 0.862$) is not significant relationship. The final step of quality management practices, organizational characteristics and organizational performance were ($\beta = 0.305$, $p < 0.809$) is there no significant relationship. The conclusion from the result illustrates that the organizational characteristics have no influence relationship between QM practices and organizational performance.

5.14 Summary of all Hypotheses Result

Table 5.103 was indicated the statement of hypotheses in this study with their result.

Table 5.103
Summary of Hypotheses

Hypotheses	Statement of Hypotheses	Result
H1	The QMP have positive relationship with OP.	Supported
H1-1	Leadership of QMP have positive relationship with OP.	Supported
H1-2	Human resources management of QMP have positive relationship with OP.	Supported
H1-3	Suppliers management of QMP have positive relationship with OP.	Supported
H1-4	Customer focus of QMP have positive relationship with OP.	Supported
H1-5	Process approach of QMP have positive relationship with OP.	Supported
H1-6	Designs of product of QMP have positive relationship with OP.	Supported
H1-7	Strategic planning of QMP have positive relationship with OP.	Supported
H1-8	Information analysis of QMP have positive relationship with OP.	Supported
H1-9	The QMP of continuous improvement have positive relationship on OP.	Supported

Table 5.103 (Continued)

Summary of Hypotheses

Hypotheses	Statement of Hypotheses	Result
H2	The QMP have effect on OP.	Supported
H2-1	The QMP of leadership have effect on OP.	Not Supported
H2-2	The QMP of human resource have effect on OP.	Not Supported
H2-3	The QMP of supplier management have effect on OP.	Not Supported
H2-4	The QMP of customer focus have effect on OP.	Not Supported
H2-5	The QMP of process approach have effect on OP.	Not Supported
H2-6	The QMP of product design have effect on OP.	Not Supported
H2-7	The QMP of strategic planning have effect on OP.	Not Supported
H2-8	The QMP of information analysis have effect on OP.	Not Supported
H2-9	The QMP of continuous improvement have effect on OP.	Supported
H3	The influence of QMP on OP is mediated by SPD.	Full Mediated
H4	The influence of QMP on SPD is moderated by OC	Not Moderated

5.15 Summary

This chapter summarizes the findings obtained from respondents of the survey that was conducted to examine the factors that influence organizational performance in Malaysia automotive industry. Firstly, the response rate of respondents is highlighted. The usable response rate was 47.89%. This is following the data of respondents descriptive, followed by discussion of non-response bias result. Testing the hypotheses in this study the multiple regression and hierarchical multiple regression have been discussed. The next section will discuss further of discussions and conclusions.

CHAPTER SIX

DISCUSSION, CONCLUSION AND RECOMMENDATION

6.1 Introduction

This section discusses and concludes the research finding results based on previous chapter. In summary, there were six chapters in this research, chapter one is introduction, followed by chapter two is literature review, research frameworks and hypotheses development in chapter three, research methodology in chapter four, analysis and findings in chapter five, lastly chapter six is discussion and conclusions. In this chapter it starts with recapitulation of study, summary of research, discussion of analysis result, relationship among the variables, quality management practices (QMP) as independent variable, organizational performance (OP) as dependent variable, mediating variable of sustainable product development and moderating variable of organizational characteristics. The contribution study in theoretical and practical aspects then followed by limitation of study and recommendation for future research.

6.2 Recapitulation of Study

Refer to chapter two of literature review, in summary the following recapitulation of research questions:

1. Do QM practices have any relationship with OP?
2. To what extend the dimensions of QMP effect the OP?

3. What is the mediating effect of sustainable product development to the QMP on OP?
4. What is the moderating effect of organization characteristics to the QMP on OP?

To find out above statement of research questions, the following research objectives are being constructed:

1. To determine the relationship of QMP and OP.
2. To determine effect of QMP on OP.
3. To explain mediating effect of sustainable product development of the QMP on OP.
4. To explain moderating effect of organization characteristics of the QMP on OP.

This study is to obtain the investigation result of QMP and OP relationship. In addition, this study also are measure each dimension in quality management practices effect on organizational performance. The study attempted to determine the mediating effect of sustainable product development on quality management practices and organizational performance, also the moderating effect of organization characteristics on quality management practices and organizational performance. The SME's automotive industry were chosen not only because of their contribution to Malaysian economy, but also because of their survival in global business environment that required the new or current products have been developed with consists of economic, environment and social elements.

Based on literature review, and performing factor analysis this study have been identified the variables of quality management practices that consists of nine dimensions (leadership, human resources management, supplier management, customer focus, process approach, design of products, strategic planning, information analysis and continuous improvement), three dimensions of sustainable products development (economic, environment, social) and organization characteristics have three components (size of firms, ownership of firms, length of time quality management adoption), and lastly the organizational performance have two dimensions (financial, non-financial) were selected.

The respondents of 91 cases in this study were obtained from cross-sectional survey Throughout Malaysia. The structured questionnaire were distributed through email and post mailed according to list of address that was given by main automotive company and directed to CEOs, general manager, manager, department head, marketing manager, sales manager, procurement manager, section head, senior engineer, engineer, supervisor of the firms. The usable response rate was 47.89% is considering acceptable for the purpose of study. The t-test of significance was conducted in this study purposely to determine that the early and late response of respondents is no significance exist.

The reliability test was conducted in this study is for ensure there are goodness of measures. Follow by factor analysis test, this test is to obtained validity of test by measuring Cronbach's alpha coefficient. The result show that item reliability used in this study is reliable.

Demographic profile in this study are categorized in two sections, where first section was personal demographic. In personal demographic profile section,

respondents' data are included of age, gender, ethnic, nationality, highest education, current position, and number of years in services. The respondent's age under 30-39 years old (40.7%), followed by under 40-49 years old (37.4%), under 20-29 years (12.1%), and lastly under 50-59 years old (9.9%). Majority of gender were males (82.4%) as compared to females (17.6%). In terms of ethnic, majority of the respondents were Malay (74.7%), followed by Chinese (20.9%) and India (4.4%). In nationality section, the Malaysian were (97.8%) compared to Non Malaysian were (2.2%). The respondent highest qualification is from bachelor holder (70.3%), diploma (19.8%), and master (9.9%). Manager position among the highest respondent rate were (52.7%), engineer and executive (34.1%), followed by general manager (11%), and lastly CEOs of company were (2.2%). Majority of respondents have experience more than 11 years were (31.9%), 4-6 years were (24.2%), followed by 7-10 years were (19.8%).

In organizational demographic section, the respondents' data are included of main product, customer of product, number of workers, company sales turnover, length of time quality management adoption, length of time sustainable product development, quality management system use in the organization and ownership of firms. In terms of customer product, the highest came from foreign customer (72.5%) and followed by local customer (27.5%). Majority of the respondents have number of workers in range 51 – 150 were (95.6%), while in range 6 – 50 staff were (4.4%). Company sales turnover in range RM 10.1 million to RM 25 million were (84.6%), followed in range RM 251,000 to 10 million were (15.4%). The length of time quality management adoption for more than 11 years were (57.1%), adoption in range 7 – 10 years were (29.7%), followed by below than 6 years were (13.2%).

Meanwhile, the length of time sustainable product development adoption in firms for below than 6 years were (58.3%), adoption in range 7-10 years were (25.3%), followed the firms in range more than 11 years were (16.5%). Most of respondents have applied the TS 16949 quality management system in their organization were (84.6%), while ISO 9001 quality management system have used by respondents organization were (15.4%). In terms of organization ownership were private owned (38.5%), foreign owned (22%), joint ventured (17.6%), public owned (14.3%), and family owned (7.7%).

The skewness test result it was shown in positioned at negative values, which indicated that almost variables in questionnaire given to them it was mostly agreed by respondents (Shukla & Gulshan, 1994, p.401). Descriptive analysis shows that QM practices have scored the value in range 4.90 to 5.47. Customer focus was scored highest mean value (5.47), then leadership scored was (5.26), supplier management (5.09), process approach (5.05), strategy planning (4.97), design of product (4.92), information analysis (4.92), continuous improvement (4.90) and human resources (4.90). Sustainable product development mean was 4.82 to 5.06. The environmental score is highest was (5.06), then societal (4.82) and economical (4.59). On organizational performance, the highest mean score is non-financial (4.72) and financial (4.67). The results shown that, quality management practices of customer focus, leadership, supplier management, process approach, strategy planning, design of products, information analysis and continuous improvement have directly positive relationship with organizational performance.

The measurement and theoretical frameworks result is illustrates there are correlation and have positive relationship The quality management practices of nine

dimensions are positively significance correlated with organizational performance. The nine dimensions are namely leadership, human resources management, supplier management, customer focus, process approach, design of products, strategic planning, information analysis and continuous improvement.

The first hypothesis has employed Pearson correlation, this test is to determine the positive relationship of each dimensions of practices and organizational performance. The result have shown that there are highly correlated (mean = 5.05), eta squared = 0.011. Meanwhile, each dimensions of quality management practices was indicated the positive strength of the linear relationship with organizational performance. The leadership of quality management practices was ($r = 0.408^{**}$, $p < 0.01$), human resources ($r = 0.681^{**}$, $p < 0.01$), supplier management ($r = 0.654^{**}$, $p < 0.01$), customer focus ($r = 0.579^{**}$, $p < 0.01$), process approach ($r = 0.634^{**}$, $p < 0.01$), product design ($r = 0.538^{**}$, $p < 0.01$), strategy planning ($r = 0.543^{**}$, $p < 0.01$), information analysis ($r = 0.605^{**}$, $p < 0.01$) and continuous improvement ($r = 0.602^{**}$, $p < 0.01$). The result have shown that human resources, supplier management, process approach, information analysis, customer focus, product design, strategy planning and continuous improvement have strong correlated with organizational performance in Malaysian automotive industry.

The second hypothesis employed multiple regression analysis in order to predict there are effect of QMP on OP. The result revealed that (R squared were 0.442, adjusted R squared were 0.380 with significant at level 0.000). The result also revealed that continuous improvement of quality management practices have effect on organizational performance ($\beta = 0.393$, $p < 0.013$).

The third hypothesis in this study predicts that sustainable product development mediate effect the quality management practices and organizational performance. This hypothesis are employed hierarchical multiple regression analysis to predict the effect and revealed that sustainable product development are fully mediated in between quality management practices and organizational performance. Consequently, Sobel test z-value result also supported that ($z\text{-value} = 7.114$, $p < 0.000$) this mean that sustainable product development is mediated effect (direct = 0.471, indirect = 0.147).

The result for the fourth hypothesis of organization characteristics is moderate variable. The Hierarchical multiple regression analysis is employed to predict the effect of organization characteristics are namely size of firms, ownership of firms and length of time quality management practices. The result revealed that there is no moderate effect in between quality management practices and organizational performance.

Thus, this study result have understood that quality management practices are important philosophy which to be enhanced their achievement in performance in terms of financial and non-financial while sustainable product development is fully mediated influencing QMP on OP, then organization characteristics is no moderate effect on these both relationship.

6.3 Summary of the Research

The aim of this study is to provide evidence concerning the factors of quality management practices, sustainable product development, and organization characteristics that influence organizational performance in Malaysian automotive

industry. In general, the study is to determine the variables in quality management practices it can enhance the organizational performance in terms of profitability and sustainability. This study also focuses organization sustainability in business environment by adopting sustainable product development as mediating variable which have influenced QMP on OP. The moderating variable in this study is organization characteristics that have no influence effect between QMP and OP.

Theoretical framework of this study is based on three integrated theory which known as resources based view theory, institutional theory, and stakeholder theory. According to Ricardo (1817), Schumpeter (1934), and Penrose (1959) resources based view theory focus on the internal resources of the organization as the determinant of competitive success. Barney (1991) expands definition of this theory by including all assets, capabilities, organizational process, organization attributes, information, knowledge, etc., that controlled by organization, and enable to conceive of and implementation strategies that improve organization efficiency and effectiveness. In this study, resources based view theory were applied when the organization are utilize the quality management practices variables of leadership, human resources management, supplier management, customer focus, process approach, design of products, strategic planning, information analysis, and continuous improvement that influence the organizational performance. All above variables are known as independent variables in this study.

Nowadays, the purpose of quality management practices scope in organization generally can be categorized in two main factors, which are costs reduction activities and improve customer satisfaction. However, new concepts of quality management practices need goes beyond of these two issues whereby

included with sustainable product development which consists of economic, environment, and social (Hemming *et al.*, 2004). Institutional theory explained the organization that adopted environmental practices (Jennings & Zandbergen, 1995), societal (Scott, 1992), economical (Hoffman & Ventresca, 2002). Furthermore, Sharma (2000) explained that by adopting institutional theory the organization could conformance the environmental strategies, focusing on regulation complying and same time will enhancement the environmental impacts of organization operation beyond the regulatory requirements. The integrates with stakeholder theory into research framework, the researcher recommended that stakeholder theory should be applied by organization for more further achievement in their business and move to third generation of quality management practices by consider to fulfill those entities who are interested or effected by the activities, and are caused the organization to fail (Foley, 2005).

The main objective of this study is divided into four categories and research questions have been developed as follows: (1) what is the relationship between quality management practices and organizational performance in Malaysian automotive industry?; (2) what is the effect of quality management practices on organizational performance?; (3) what is mediating role of sustainable product development can influence QMP on OP?; (4) what is moderating role of organization characteristics can influence QMP on OP. To expanding further analysis of this solution, a theoretical framework and research hypotheses was reviewed and developed. Questionnaires were distributed among the respondents and data received was analyzed using SPSS software.

The relationship between organizational performance as dependent variable and nine independent variables of quality management practices were examined by using Pearson correlation analysis test, while the effect of quality management practices on organizational performance was adopted the multiple regression analysis. While the hierarchical multiple regression analysis were performed to determine the sustainable product development as mediating effect the quality management practices on organizational performance, and hierarchical multiple regression analysis also use to examine the organization characteristics as moderating variable that effect the quality management practices on organizational performance.

Development of studies hypotheses are based on comprehensive literature review from various authors such as (Flynn *et al.*, 1995; Ahire *et al.*, 1996; Merino-Diaz, 2003). Meanwhile the instruments were constructed by adopted or adapted are based on previous authors. Population of study were included all automotive vendors or suppliers throughout Malaysia. The survey method is using questionnaires design and distributed among the vendors based on random sampling. Total 125 questionnaires were distributed to all automotive vendors in period March 2013 to April 2013. Then, second period were 190 questionnaires was mailed to all automotive vendor in May 2013 to June 2013. The main issue in mailed survey method is late responds from vendors, for that reason the researcher conduct second period to follow up program. However, in total 91 questionnaires was returned and validated for this study.

The process sequence of analyzing data in this study is beginning with descriptive analysis of respondents which are categorized into two sections is known

as personal demographics and organization demographics, then non-response bias test, skewness and kurtosis test, factor analysis, reliability test, normality, linearity, multivariate outlier and multicollinearity. These tests are necessary in order to verify the validity and reliability of data before proceed for hypotheses test. There are nine hypotheses was developed in this study which H1-1 to H1-9 are using Pearson correlation, H2-1 to H2-9 are using multiple regression test, while H3, H4 are using hierarchical multiple regression analysis test. The result all these testing are to determine that hypotheses have been developed is accepted or rejected. Table 6.1 was illustrated in details the research objectives, research questions and result of hypotheses.

Table 6.1

Research Objective, Research Questions and Hypotheses

Research Objective	Research Questions	Hypotheses Explanation		Result
1) To examine the relationship between QMP and OP.	1) What is the relationship between QMP and OP?	H1: The QMP have positive relationship with OP.		Highly Correlation ($r = .618^{**}$, $p < 0.01$) Eta squared = 0.011
		H1-1	Leadership of QMP have positive relationship with OP.	Accepted ($r = .408^{**}$, $p < 0.01$)
		H1-2	Human resources of QMP have positive relationship with OP.	Accepted ($r = .681^{**}$, $p < 0.01$)
		H1-3	Supplier management of QMP have positive relationship with OP	Accepted ($r = .654^{**}$, $p < 0.01$)
		H1-4	Customer focus of QMP have positive relationship with OP	Accepted ($r = .579^{**}$, $p < 0.01$)
		H1-5	Process Approach of QMP have positive relationship with OP.	Accepted ($r = .634^{**}$, $p < 0.01$)
		H1-6	Product design of QMP have positive relationship with OP	Accepted ($r = .538^{**}$, $p < 0.01$)
		H1-7	Strategy Planning of QMP have positive relationship with OP	Accepted ($r = .543^{**}$, $p < 0.01$)
		H1-8	Information analysis of QMP have positive relationship with OP	Accepted ($r = .605^{**}$, $p < 0.01$)
		H1-9	Continuous improvement of QMP have positive relationship with OP	Accepted ($r = .602^{**}$, $p < 0.01$)

Table 6.1 (Continued)

Research Objective, Research Questions and Hypotheses

Research Objective	Research Questions	Hypotheses Explanation		Result
2) To examine the effect of QMP on OP	2) What is the effect of QMP on OP?	H2: The QMP have effect on organizational performance.		Accepted ($R^2 = .442$, $p < 0.01$)
		H2-1	The QMP of leadership have effect on OP.	Not Accepted ($\beta = -.115$, $p < 0.412$)
		H2-2	The QMP of human resources have effect on OP.	Not Accepted ($\beta = .014$, $p < 0.911$)
		H2-3	The QMP of supplier management have effect on OP.	Not Accepted ($\beta = .175$, $p < 0.257$)
		H2-4	The QMP of customer focus have effect on OP.	Not Accepted ($\beta = .112$, $p < 0.330$)
		H2-5	The QMP of process approach have effect on OP.	Not Accepted ($\beta = -.062$, $p < 0.723$)
		H2-6	The QMP of product design have effect on OP.	Not Accepted ($\beta = .176$, $p < 0.218$)
		H2-7	The QMP of strategic planning have effect on OP.	Not Accepted ($\beta = -.107$, $p < 0.482$)
		H2-8	The QMP of information analysis have effect on OP.	Not Accepted ($\beta = .169$, $p < 0.272$)
		H2-9	The QMP of continuous improvement have effect on OP.	Accepted ($\beta = .393$, $p < 0.013$)

Table 6.1 (Continued)
Research Objective, Research Questions and Hypotheses

Research Objective	Research Questions	Hypotheses Explanation	Result
3)To investigate the mediating effect of SPD on QMP and OP	3) What is mediating role of SPD can influence the relationship between QMP and OP?	3) The influence of QMP on organizational performance is mediated by sustainable product development.	Accepted Fully Mediated ($\beta = .257$, $p = 0.035$) Eta Squared = 0.17 Sobel z-value = 7.114, Sig. 0.000 Direct = 0.471 Indirect = 0.147
4) To investigate the moderating effect of organization characteristics on QMP and OP.	4) What is moderating role of organization characteristics can influence the interrelationship between QMP and OP?	4) The influence of QMP on organizational performance is moderated by organization characteristics.	Not Accepted No Moderated Step 1($\beta = .618$, $p = 0.000$) Step 2: ($\beta = .026$, $p = 0.862$) Step 3: ($\beta = .305$, $p = 0.809$) Eta Squared = 0.001

Note: QMP (Quality Management Practices), SPD (Sustainable Product Development), OP (Organizational Performance).

6.4 Discussion of Analysis Result

This section discusses the findings of research. As stated in chapter two there are nine independent variable in this research they are leaderships, human resources management, supplier management, customer focus, process approach, design of product, strategic planning, information analysis, and continuous improvement. Thus, the sustainable product development considered in this study as mediate variable, whereas organization characteristics as moderate variable. This section discusses details as below.

6.4.1 Organizational Performance Result

The main objective of this study is to measure the organizational performance results in Malaysian automotive industry. The organizational performance are measured based on two variables which are financial and non-financial. The financial consists of profit, sales growth, cost reduction, return of investment, cash flow, and return of asset. Meanwhile, in non-financial consists of business performance, customer satisfaction, productivity, process efficiency, employees' satisfaction, market share, new market, pollution awareness, emissions issues, and energy usage. Continuous measurement scale was used in this study where (1) indicate as low and (6) indicate as high.

Initially, the data was analyzed using descriptive statistics. The mean scores result from this study have shown that organizational performance in Malaysia automotive industry is highly correlated the result was ($m = 5.05$) that indicate agreement with the statement. Furthermore, among the highest mean score in quality management practices is customer focus the result was

score ($m = 5.47$). Nevertheless, the result showed that customer focus is important agenda to increase organizational performance result. Meanwhile, leadership variable of quality management practices of mean score was ($m = 5.26$). The mean score for supplier management was ($m = 5.09$), this indicate that supplier management also play important role in automotive industry, while mean score for process approach was ($m = 5.05$). The score for strategy planning was ($m = 4.97$). Design of products and information analysis have similar mean score value was ($m = 4.92$). Meanwhile, mean score for human resources and continuous improvement have same result was ($m = 4.90$). The result indicated that in Malaysia automotive industry are realized that customer focus, leadership, supplier management and process approach have played important role in their business. Based on Skewness result in (Table 5.18) have shown that the data was in at negative values (-0.419) zone it is indicated that the respondents are agreed with all variables are distributed to them in structured questionnaire (Shukla & Gulshan, 1994, p. 401), especially in Malaysian automotive industry.

The further improvement area in Malaysian automotive industry could be stressed in field of leaderships, human resources management, supplier management, customer focus, process approach, design of product, strategic planning, information analysis, and continuous improvement.

6.4.2 The Relationships between QMP and OP

First hypotheses in this study are to determine the relationship between quality management practices and organizational performance. Nine

hypotheses have been established to measure the relationship are H1-1 to H1-9 and which variables as known as leadership, human resources management, supplier management, customer focus, process approach, design of products, strategic planning, information analysis, and continuous improvement.

In general, by implementing all these quality management practices and result indicated was ($R^2 = .442$) it was explained 44.2% the variance of organizational performance. It revealed that quality management practices have positive impact with organizational performance. This finding was support by Jirapattarasilp (2011) study in Thailand automotive industry, Arumugam *et al.*, (2011) study in Iran automotive industry, Punnakitikashem *et al.*, (2010) study in ASEAN country and Park *et al.*, (2006) study in Korea automotive industry. In details, next it explained the result among the variables.

First variable of quality management practices is leadership that has positive relationships with organizational performance. Pearson correlation result was ($r = .408^{**}$) it indicated that leadership is medium effect in relation with organizational performance. As suggested by Dale and Plunkett (1995), Juran (1988) leadership role has been identified as one of major successful factors in quality management practices. Similarly, Das *et al.*, (2011) agreed that in twenty first century leadership should goes beyond the boundary of formal power, and create a new environment of inter-personal influence and changes. Arumugam *et al.*, (2011) found leadership have positive relationship with organizational performance in Iran automotive industry, while

Jirapattarasilp (2011) agreed that leadership play important role in effect organizational performance in Thailand automotive industry.

The second variable of quality management practices is human resources management, where Pearson correlation result was ($r = .681^{**}$) it indicated human resources is strong effect in relationship with organizational performance, where any changes in human resources management may effect an organizational performance. As claimed by quality gurus such as Crosby (1979); Deming (1986); Ishikawa (1976) enhancement of human resources factors can improved organization performance. Putri and Yusof (2009) agreed that human resources influenced the organization performance in automotive sector in Malaysia and Indonesia country. Third variable of quality management practices is supplier management, Pearson correlation result was ($r = .654^{**}$) this indicated that supplier management have strong relationship with organizational performance, whereby supplier management may have high impact on performance of the organization in automotive industry. Monczka *et al.*, (1998) stressed that the supplier quality program can helped main manufacturer to achieve high performance. According to Takeshi and Fujimoto (2001), in automotive industry the passenger car could have contains more than 30,000 parts which mean that supplier performance is critical element to main manufacturer of quality performance outcome. Punnakitakashem *et al.*, (2010) agreed that supplier management have positive relationship with organizational performance in ASEAN automotive industry.

Fourth variable of quality management practices is customer focus, Pearson correlation result ($r=.579^{**}$) it shown customer focus have strong relationship with organizational performance. In Malaysian automotive industry, many vendors had realized that customer focus become important agenda in their business. Jusoh *et al.*, (2008) viewed customers as people who buy and use their products. It support to quality gurus (Crosby, 1979; Deming, 1982; Juran, 1988) claimed the organization should defined and identified clearly the customer needs. Punnakitakashem *et al.*, (2010) agreed that customer focus have positive relationship with organizational performance in ASEAN automotive industry.

Fifth variable of quality management practices is process approach, Pearson correlation result was ($r = .634^{**}$) that indicated process approach are strong effect in relationship with organizational performance. The finding is similarly claimed by Johansson and Garvare (2007) the aim of process approach is to deliver products that satisfy the customer needs. Meanwhile, Eklund (2001) had classified a process approach as a series of activities with performed and controlled by human, with aim of transforming an input to desired output. This findings was support by Jirapattarasilp (2011) mentioned that process approach have positive relationship with organizational performance in Thailand automotive industry.

Sixth variable of quality management practices is design of products, Pearson correlation result was ($r = .538^{**}$) that shown design of product is strong effect in relationship with organizational performance. This result was supported by Putri and Yusof (2009) claimed that design of product have

positive relationship to organizational performance in Malaysia and Indonesia automotive industry, Romania automotive industry (Isac, 2004). Seventh variable of quality management practices is strategy planning, Pearson correlation result was ($r = .543^{**}$) it indicated strategy planning have strong effect in relation with organizational performance. Quinn (2000) claimed that strategy planning is a pattern or plan that integrates an organization major goal, policies, objective that to be achieved in organization strategy. This finding was supported by Punnakitikashem *et al.*, (2010) was claimed that strategy planning have positive relationship with organizational performance in automotive industry on ASEAN country.

Eighth variable of quality management practices is information analysis, Pearson correlation result was ($r = .605^{**}$) it shown information analysis have strong effect with organizational performance. Wiele and Brown (2002) stressed that information analysis should be précised and needs some adjustment to meets quality program in order to enhance their strategic target. This findings was supported by Punnakitikashem *et al.*, (2010) was claimed that information analysis have positive relationship with organizational performance in automotive industry on ASEAN country. Ninth variable of quality management practices is continuous improvement, Pearson correlation result was ($r = .602^{**}$) it mean that continuous improvement was strong effect with organizational performance. As findings by Marin-Garcia *et al.*, (2008) continuous improvement is an important strategic tool to increase competitiveness in their organization. This finding was supported by Osman *et al.*, (2009) found that continuous improvement

have significant relationship with organizational performance in Malaysia automotive industry.

In summary, the above findings have shown that the quality management practices consists of leadership, human resources management, supplier management, customer focus, process approach, design of products, strategic planning, information analysis, and continuous improvement have positive relationship and each of these dimensions has been acknowledge as important to success in the organizational performance.

6.4.3 The Effect of QM Practices on Organizational Performance

Second hypotheses in this study are to determine the effect of quality management practices on organizational performance. Nine hypotheses have been established to measure the relationship are H2-1 to H2-9 and which variables as known as leadership, human resources management, supplier management, customer focus, process approach, design of products, strategic planning, information analysis, and continuous improvement.

In general, by implementing all these quality management practices and result indicated was ($R^2 = .442$) it was explained 44.2% the variance of organizational performance. It revealed that quality management practices have effect on organizational performance. This finding was support by Jirapattarasilp (2011) study in Thailand automotive industry, Fallah *et al.*, (2011) study in Iran automotive industry, Punnakitikashem *et al.*, (2010) study in ASEAN country and Park *et al.*, (2006) study in Korea automotive industry. The result have revealed that continuous improvement of quality

management practices have effect on organizational performance ($\beta = 0.393$, $p < 0.013$). This finding was support by Osman *et al.* (2009), Zadry and Yusof (2006) in Malaysian automotive industry.

In summary, there are effect of QMP on OP and continuous improvement activities are significance effect on organizational performance in Malaysian automotive industry.

6.4.4 Mediating Effect of Sustainable Product Development between QM Practices and Organizational Performance

Third objective of this research is to determine the sustainable product development as mediating variable is effect between quality management practices and organizational performance in Malaysian automotive industry.

Based on result finding it revealed that sustainable product development have influenced quality management practices and organizational performance. Table 5.97 illustrated that sustainable product development variable as fully mediated which ($p = .035$) is significant when mediating variable is controlled. As result, sustainable product development influence of 9.1% of variance in organizational performance (r squared have increased from 0.382 or 38.2% to 0.473 or 47.3%). Effect size calculation was ($f^2 = 0.17$) it consider small to medium effect (Cohen, 1988). The beta value shown the significant result when before mediating was .257 and after mediating it was at .618, it means that sustainable product development have influence as mediating variable.

MacKinnon and Dwyer (1993) claimed that to support the mediated variables, Sobel test statistically was performed to determine the indirect path from the quality management practices to the organizational performance is statistically significant different from zero. The result was revealed that test statistic is equal to 7.116, with standard error 0.072. Meanwhile, statistical significance is equal to ($p = 0.000$). It can conclude that the performance of QMP on OP is mediated by sustainable product development. Meanwhile, Sobel test of z-value have revealed that ($z\text{-value} = 7.114, p < 0.000$) also support the mediating variable of sustainable product development.

The result in this study empirically has evidence that sustainable product development in Malaysia automotive industry have influence between QMP on OP. Even though, quality management practices solely can have direct impact on the organizational performance, but by implementing sustainable product development as mediating variables it could enhancement further of organizational performance, it could make more competitive advantage in Malaysia automotive industry in sustainable issues, especially in term of environment, economic and society (Hemming *et al.*, 2004). This finding are similarly suggested by Yasuda and Ishioka (2009), an organizational have advantage when there are implementing both of quality management practices and sustainable product development simultaneously.

Finding result also support the theoretical evidence that quality management practices should goes beyond its normal principal activities such as customer focus and cost reduction activities. On other hand, the organizations that implementing sustainable product development that

considering environmental, economical, and societal issues will have more advantages which those are not implemented it. As recommended by Foster and Jonker (2007) the evolution of quality management it requires consideration the issues of both customer and non-customer stakeholder.

6.4.5 Moderating Effect of Organization Characteristics in between QM Practices and Organizational Performance

Fourth research objective in this study is to determine the moderating effect of organization characteristic (size of firms, ownership of firms and length of time quality management adoption). Table 5.101 was illustrated that organization characteristics have moderated influence the relationship between QMP and OP. For details, Table 5.101 shown that model 3 standard beta value was ($\beta = .305$, sig. $F = .809$) it means that there are no exist interaction effect of organization characteristics as moderating variable. Table 5.101 also revealed that model 2 standard beta value was ($\beta = .026$, sig. $F = .862$) the result are not significant in relationship with organizational performance. According to Sharma *et al.* (1981) this type of moderating are categorized as no moderation.

These findings are consistent with (Gagnon & Toulouse, 1996; Germain, 1996; Uhlaner *et al.*, 2010) size of firms, (Ahire *et al.*, 1996; Swamidass & Kotha, 1998; Uhlaner *et al.*, 2010) ownerships of firms, (Sohal & Terziovski, 2000; Yaacob, 2010) length of time QM adoption.

6.5 Major Findings of Study

The result of this study shown that quality management practices, sustainable product development, organization characteristics and organizational performance have influence each other in Malaysia automotive industry. This study focused on the relation of QM practices and organizational performance, the influence of sustainable product development as mediator variable and impact of organizational characteristic as moderating variable that related to QM practices and organizational performance. Furthermore, this study is to focus three agendas in Malaysian automotive industry. Firstly is to investigate the relation of quality management practices and organizational performance. Then, secondly is to demonstrate the each dimensions in QMP are effect on OP. Thirdly, this study sheds insight into mediating variable of sustainable product development effect the QMP on OP. Finally is to investigate the influence of moderating role of organization characteristics, which are mostly ignored by previous studies.

The following major result of study can be illustrated as follows:

1. Quality management practices have positive relationship with organizational performance. Meanwhile, the components of quality management practices namely, leadership, human resources management, supplier management, customer focus, design of products, strategic planning, information analysis, and continuous improvement have positive relationship with organizational performance.
2. Quality management practices have influence the organizational performance. Meanwhile continuous improvements have effect on organizational performance.

3. Sustainable product development has the greatest positive advantage with quality management practices to influence with organizational performance. Components of sustainable product development namely, economical, environmental, and societal have influence towards organizational performance.
4. Organization characteristics no foster the effect of QM practices on organizational performance.

6.6 Contributions

This study contributed the theoretical and practical aspects of quality management practices and sustainable product development in Malaysia automotive industry. On theoretical aspects, the result finding it can help academia in enhancement their knowledge in quality management practices and sustainable product development. On other hand, in practical aspects it helps the practitioner goes beyond quality management and sustainable product development for their business sustainability. A detailed explanation of these contributions is provided below.

6.6.1 Theoretical Contributions

There are three theoretical contributions of this research. First contribution is theory that integrates with various theories as to increase the organizational performance. Second contributions are empirically determining the suitability of variables and validate a framework in the context of organizational performance. Third contributions in this study are integrates variable to the framework which sustainable product development as mediating variable, organization characteristics as moderating variable that

enhance organizational performance. Figure 6.1 illustrated model effectiveness of this study.

In Figure 6.1 was revealed that quality management practices are important element that significantly have direct impact relationship with organizational performance ($r = .618$, $p = 0.000$). This finding was support by Jirapattarasilp (2011) study in Thailand automotive industry, Arumugam *et al.*, (2011) study in Iran automotive industry, Punnakitikashem *et al.*, (2010) study in ASEAN country and Park *et al.*, (2006) study in Korea automotive industry. In theoretical, resource based view theory explained the focus of internal resources in organization as major determinant of competitive success (Ricardo, 1817; Schumpeter, 1934; Penrose, 1959). Barney (1991) stressed that resource based view theory scope could expand further with including all assets, capabilities, organizational process, firm attributes, information and knowledge. Resource based view theory is validated in this study.

In addition, in this study found that sustainable product developments are fully mediated influence between quality management practices and organizational performance ($\beta = .257$, $p = .035$). It indicated that organizational performance can be improved further when variable of sustainable product development is implemented. As claimed by Ishioka and Yasuda (2009) the organizations have both practices of quality management practices and sustainable product development, therefore have more advantages in sustainability in their business environment. Institutional theory emphasizes the role of organization to adopt social aspects, environmental

and economical in responses to institutional pressures on complying regulations (Sharma, 2000). This theory is validated the empirically evidence that sustainable product development has significant improvement in relation with quality management practices and organizational performance. There were an integration of quality management practices as independent variable and sustainable product development as mediate variable did not include in any previous studies.

In this study also revealed that organization characteristics as not moderated variable in effect the quality management practices and organizational performance ($\beta = .026$, $p = .862$). This findings was support by (Gagnon & Toulouse, 1996; Germain, 1996; Uhlaner *et al.*, 2010) size of firms, (Ahire *et al.*, 1996; Swamidass & Kotha, 1998; Uhlaner *et al.*, 2010) ownerships of firms, (Sohal & Terziovski, 2000; Yaacob, 2010; Lee *et al.*, 2009) length of time quality management adoption. The organization characteristics of firm size, ownership of firms, and length of time quality management adoption did not include as moderate variable in any previous studies framework.

Stakeholder theory defines all those entities who are interested in effected by the activities, or existences are capable of causing the enterprise to fail (Foley, 2005). The evolution of quality management it requires consideration of both customer and non-customer stakeholder (Foster & Jonker, 2007). The effectiveness of model framework in this study it can be illustrated in Figure 6.1

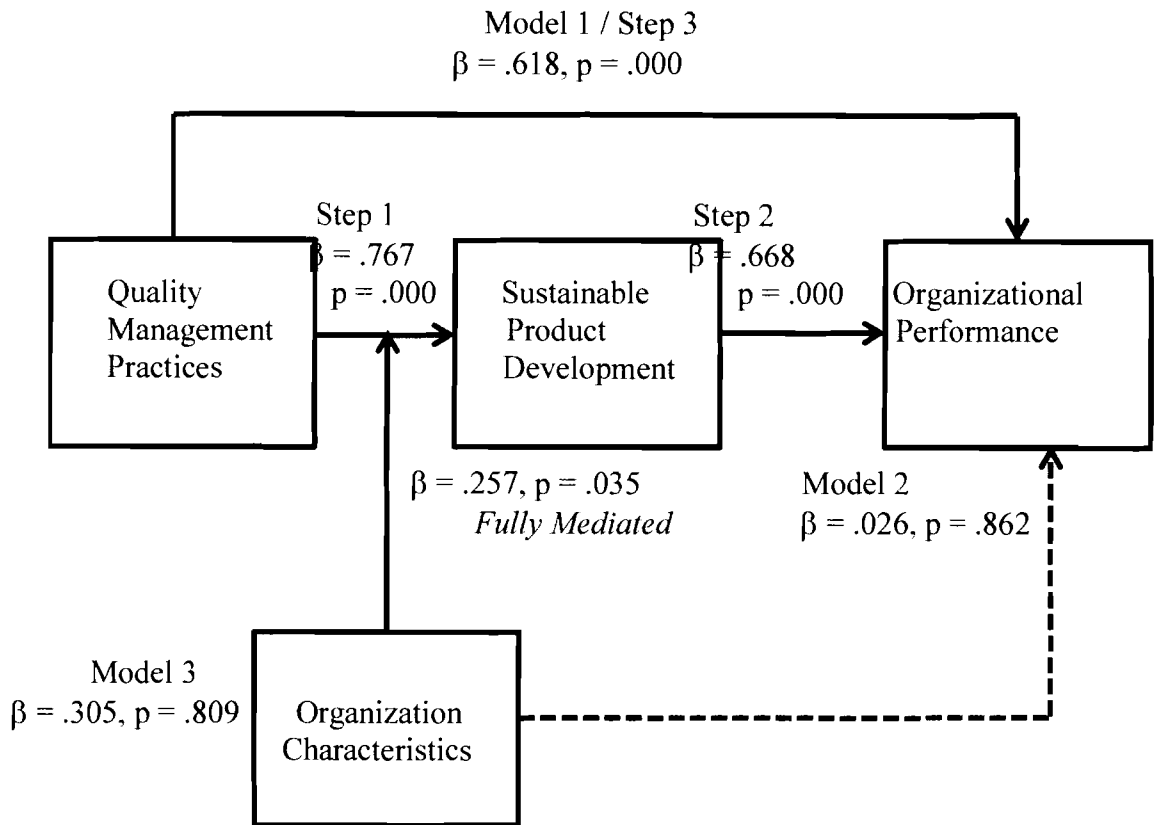


Figure 6.1
Effectiveness Model of Framework

In Figure 6.2 illustrated the integration of three theories which are resources based view theory, institutional theory and stakeholder theory that can improve the organizational performance especially in automotive industry context. The theoretical contribution in this research will benefit to industry, practioner and body of knowledge.

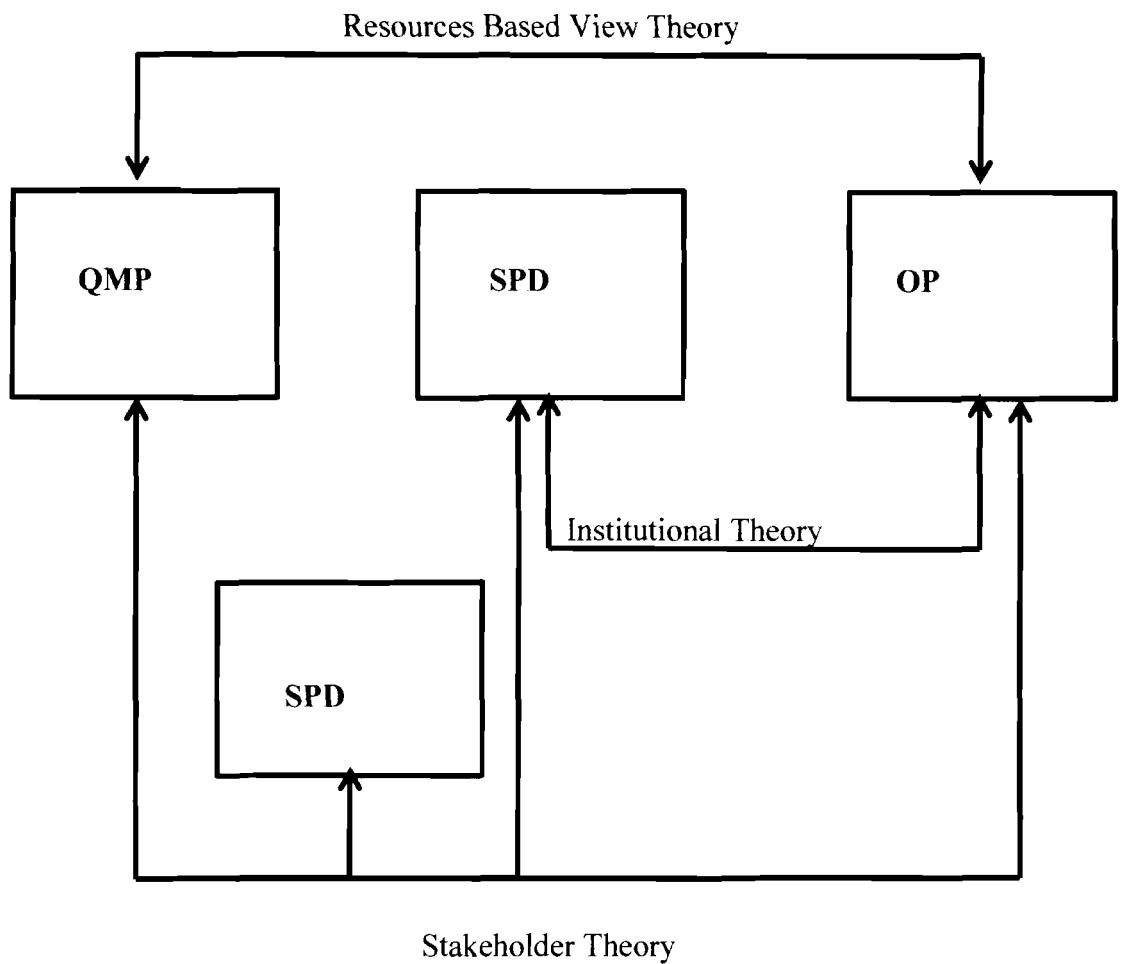


Figure 6.2
The Framework of Theoretical Contribution

6.6.2 Practical Contributions

This study empirically evidence that quality management practices have significant contribution to organizational performance in automotive industry. Result from this study also shown that all variable introduced in this study directly have positive relationship with organizational performance. These variables are based on previous literature reviewed and empirical findings from various authors. Variables use on QMP in this research are known as leadership, human resources management, supplier management, customer focus, process approach, design of product, strategic planning,

information analysis, and continuous improvement. As result, automotive vendors in Malaysia should implement all these quality management practices in order to obtained higher achievement in their business.

Second practical contributions in this study is new important factors are sustainable product development. Whereby, current practices of quality management in organization it should be expand further with consider other element such as an environmental, economical, and societal while their develop new or review existence product. Study result also proof that sustainable product development is fully mediated between quality management practices and organizational performance. As result, this study empirically supports the new approach of quality management practices were included with sustainable product development. Third practical contributions are moderating variable of organization characteristics are not influence between quality management practices and organizational performance. Result from this study is revealed that an organization characteristic is not significant in relation organizational performance. However, there are significant when integrates with quality management practices and organizational performance.

In general, this research has revealed that quality management practices have positive relationship with organizational performance. It further can improve the organizational performance when implementing sustainable product development in their new or existing product. The organization characteristics elements also have significant influence towards organizational performance.

Although the findings of the research contribute to theoretical and practical aspects, there are several important limitations. Next section the researcher will provide the limitations of this study.

6.7 Limitations of the Study

In this section, researcher will discuss the limitation of this study. There are shortcomings that could not be avoided in this research. The limitation was highlighted as bellows:

- a. The first limitation is the sample frame. The sample frame in this study was automotive industry and cannot be generalized to another industry due to differences in the type of business environment.
- b. The second limitation is time allocated for collecting the data. The total is four months was spending to collect the data which start from March 2013 to June 2013. This research is use cross-sectional surveys type which the data are collected from respondents at a single point in time where it may overlook other trends issue (Gay *et al.*, 2009). However, in this study the researcher have been distributed the questionnaires to respondents in two sessions is due to poor response rate.
- c. The third limitation is questionnaires were distributed to Malaysia automotive vendors without consider the classification of vendors whether they are in tier one, tier two or tier three. The questionnaires was send to respondents are solely based a list addressed given to researcher. A total 91 respondents are replied and validate to use in this study. However, the non-response bias test revealed that there are not significant result and valid for this study.

6.8 Suggestions for Future Research

This research focuses on quality management practices, sustainable product development, organization characteristics, and organizational performance in automotive industry. Future research could be suggested as below:

- a. In this research have revealed that sustainable product development is fully mediated in relationship with quality management practices and organizational performance. Future research should conduct further study to identify another key important element in sustainable product development could be more enhancements the relation between quality management practices and organizational performance.
- b. The moderating variable of organization characteristics use in this research is size of firms, ownership of firms and length of time quality management adoption. Future research should select more or less variable that contributes more significant to quality management practices, sustainable product development, and organizational performance.
- c. This research using sample random sampling throughout Malaysia automotive industry without considering the categorized of vendors are in tier one, tier two, or tier three. Future research should take this consideration the categorized the type of vendor tier in automotive industry.
- d. The scope of this research are limited to automotive industry in Malaysia, whereas in future research this scope should be widen into other sectors such service industry, banking industry, and food industry.

- e. Lastly, this research use quantitative survey method to collect the relevant data in industry, future research should use another method such as qualitative or mixed method.

6.9 Recommendation

In this section, the findings of this research are presented and recommends to firm of automotive industry and to government related policymakers. In automotive industry the organization should align their mission, vision and strategies to attained customer satisfaction, cost reduction are throughout implementation of quality management practices. Furthermore, by implementing sustainable product development in their current or new product it could more value added in terms of economical, environmental and societal issues. Meanwhile organization characteristics in terms of size of firm, ownership, and length of time quality management adoption also could effect the organizational performance.

For policymakers, it could be enhance achievement of organization sustainability in business by adopting regulations that in automotive industry sector there are needed to emphasize both of QM practices and sustainable product development in their future product. This direction could be benefit for both of customer and non-customer elements.

6.10 Summary of Study

In considering the important contribution of automotive industry to the economy, this research is designed to identify the future direction of quality management practices should be implemented among the vendors in Malaysia. This

research has successfully revealed the relation QM practices and organizational performance. Those variables are identify in quality management practices are leadership, human resources management, supplier management, customer focus, process approach, design of products, strategy planning, information analysis, and continuous improvement.

In this research also have been identifying a mediating variable of sustainable product development in relation QM practices and organizational performance. In other words the organizational performance is better result in term of economic achievement, environmental friendly and improved society relationship when implement the sustainable product development and proper selecting the factors contribute to organization characteristics as moderating variable in automotive industry.

Instrument for this research intensively reframe and retest in order to achieve research objective in relations QM practices, sustainable product development, organization characteristics, and organizational performance. The integration of theory in term of theoretical and practical aspects in this study have been established and can use for future research. The result has revealed that quality management practices are highly correlated among the automotive industry in Malaysia. This indicated Malaysia vendors in automotive industry realized that quality management, especially continuous improvement is one of important tools that can achieve profit and sustainability in business. Furthermore, overall performance could be improved further with implementing sustainable product development with include environmental, economical, and societal elements in their new product development. This research has successfully provides early momentum for future research in

automotive industry that can influenced to other industry. Result from this research will give the implication to academia and practitioner in QM practices, sustainable product development in automotive industry.

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