

# RELATIONSHIP BETWEEN QUALITY MANAGEMENT PRACTICES, SUSTAINABLE PRODUCT DEVELOPMENT RELATIONSHIP BETWEEN QUALITY MANAGEMENT PRACTICES, SUSTAINABLE PRODUCT DEVELOPMENT AND ORGANIZATIONAL PERFORMANCE

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## Abstract

*This paper presents a study on the relationship between quality management practices and organisational performance, while exploring the influence of sustainable product development in the Malaysian automotive industry context. The demand for high quality is emerging as the single most critical factor for organisations to survive in the ever-expanding global marketplace, where quality is vital in determining the economic success of manufacturing firms. Furthermore, organisations that minimise the negative environmental impact of their products, process recycling of post-customer waste, and establish environmental management systems, are poised to expand their market or displace competitors that fail to promote strong environmental performance. A number of empirical studies had also concluded that adopting environmental management does bring certain advantages for the business. However in the Malaysian automotive industry context, there is still lack of researchers that seek to determine the relationship of quality management practices, sustainable product development, and organisational performance. Even though the relationship between quality management practices and organisational performance has been widely discussed, there still exists potential empirical study on sustainable product development. This paper describes the relationship of sustainable product development as a moderator that influences the relationship between quality management practices and organisational performance. The outcome of this research effort may offer more viable solutions for those firms in the automotive industry to enhance organizational performance in terms of overcoming global competition.*

*Keywords: Quality management practices, sustainable product development, organisational performance, Malaysian Automotive Industry*

## Introduction

In these recent decades, quality management practices and sustainable product development have played important roles in advancing firms in the competitive market. Thus, it is widely believed that the underlying practices in quality management are fundamental and essential for competitive survival of organisations (Nair, 2006), and nowadays, many organisations have embedded quality management practices into their operations. However, in order to survive, these organisations must meet the requirements and expectations from a number of actors that can cause the organisation to fail (Foley, 2005).

Meanwhile, there is also increasing environmental concern, as was publicised during the Earth Summit Conference (United Nations Conference on Environmental and Development) which was held in Rio de Janeiro in 1992. These growing environmental issues, coupled with public pressure and stricter regulations, are fundamentally impacting the way organisations design and launch new products across the globe (Choi, Nies, & Ramani, 2008). Thus, environmental values in business play a great role in the marketplace today.

The concept of quality management was developed as the result of intense global competition (Zakuan, Yusof, Saman, & Shaharoun, 2007). Meanwhile the understanding of sustainable product development is concerning the three main pillars: environmental,

economic, and social aspects (Hemming, Pugh, Williams, & Clackburn, 2004). The positive relationship between quality management practices and organisational performance has been studied by many authors (Flynn, Schroeder, & Sakakibara, 1995; Powell, 1995; Lakhali, Pasin, & Limam, 2006), and the results of which encourages organisations to take the initiative to implement quality management practices.

For the Malaysian automotive industry, the implementation of quality management practices is necessary for optimising their normal operations. Meanwhile, studies by many authors had identified that, in order to become a surviving business in the ever competitive market, these organisations need to adopt quality management practices that focus on improving quality, which can substantially improve organisational performance (Yahya & Goh, 2001). Furthermore, quality is vital determining the economic success of manufacturing companies (Curkovic, Vickery, & Droge, 2000). However, to focus on quality alone is still not sufficient enough for organisations to survive without considering customer focus (Ishioka & Yasuda, 2009).

In other words, a consideration of quality management practices and sustainable product development made by organisations toward their new product launch 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.

Studies of quality management practices in various industries have been performed by many authors. According to Garvin (1986) and Curkovic *et al.*, (2000), for an organisation in an increasingly competitive environment to survive the ever-expanding global market place, quality is vital in determining the economic success of companies and industries. However, in the face of growing environmental concern, coupled with public pressure and stricter regulations, organisations are finding fundamentally new approaches to the design and launch of their new products worldwide (Choi, Nies, & Ramani, 2008).

As noted by Smith and Sharicz (2011), the organisation should take into account not only the simple profit of their business operations, but also to adopt a triple bottom-line perspective that includes economic, social, and ecological implications of doing business. The organisation would potentially be able to achieved superior business performance if they are willing to take extra measures for gaining competitive advantage. Among these measures, quality management practices and sustainable product development have been emphasised time and time again. However, the relationship between environmental and societal factors, on the one hand, and quality management, on the other hand, is much less researched (Lagrosen, 2004). Sustainability issues, also known as the triple bottom-line (Hemming, Pugh, Williams, & Clackburn, 2004), have been used as a new paradigm to appraise the success of an organisation. It also defines the balance of sustainability from three different aspects; the environmental, social, and economic aspects as the "three legs of sustainability" (Newport, Chesnes, & Linder, 2003). Quality and quality assurance of the natural environment have been perceived as urgent management issues and it is clear that new thinking is needed to tackle the environmental and societal concerns of the global community (Quazi, Khoo, Tan, & Wong, 2001).

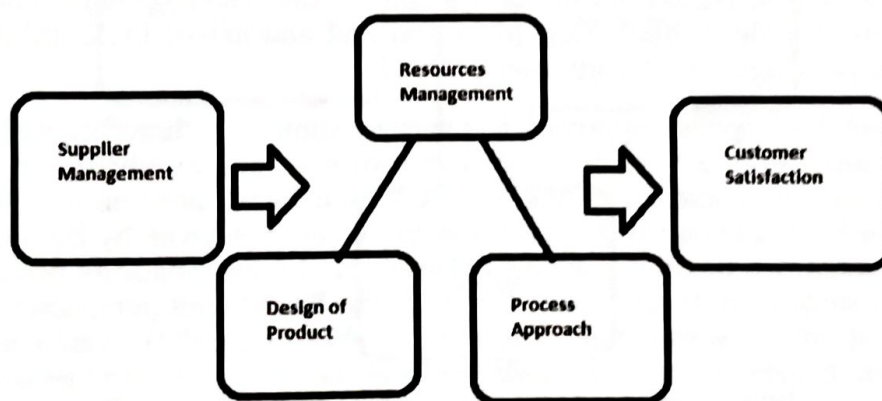
In most countries, small and medium enterprises (SMEs) dominate the industrial and commercial infrastructure. More than 90 percent of manufacturing in Malaysia are classified as SMEs. The automotive industry has made remarkable positive contributions to the world economy and people mobility. However, its products and processes are significant source of environmental impacts (Nunes & Bennett, 2010). As highlighted by the Toyota report (Toyota, 2007), it is estimated that there will be two billion cars on the road by 2050. Thus issues of carbon emission control will be highly debated, especially regarding by what percent countries should be responsible for reducing their emissions. As for the Malaysian case, there is finding that there are marginal considerations of environmental policy for the overall pursuit of social economic advancement (Hezri & Hasan, 2006). Additionally, the automotive industry is affected by rapid changes in the business environment. The capabilities to sustain in business depend largely

on how these organisations apply practices of quality management and sustainable product development. Significantly, as highlighted by Ishioka and Yasuda (2009), the organisation is forced to conform to both requirements of ecological regulation and customer satisfaction; if one of them is not fully satisfied, the organisation would find difficulties in continuing the business.

As recommended by Sila and Ebrahimpour (2005), quality management practices should be implemented as a holistic integrated system rather than as an implemented subset of quality management practices. Moreover, the relationship of integrated quality management and environmental management (sustainability product management) has been found to be significantly positive (Zeng, Tian, & Shi, 2005). However, in practice it has been proven difficult to deal with separate management systems covering quality and environmental aspects, especially in ensuring that they are aligned with organisational strategy (Wilkinson & Dale, 2002). And yet, the presence of quality management does not ensure the functionality of a quality system in an organisation (Van der Wiele & Brown, 2002; Gotzamani, 2005; Sroufe & Curkovic, 2008). However, significant research which links quality management practices and sustainable product development in the automotive industry is severely limited. The goal of operational performance is focused on maximising efficiency and effectiveness, through improving systems and processes, as well as aligning with business objectives and customer requirements (Yusuf, Gunasekaran, & Dan, 2007). However, this study is planned to measure beyond the current operation measurement practices, which may include the measurement of the third era of quality management, such as considering stakeholder theory (Foley, 2005).

### 1. Quality Management Practice

When the expression “quality” is used, one usually thinks in terms of an excellent product or service that fulfils or exceeds one’s expectations. These expectations are based on the intended use and the selling price. According to ANSI/ASQC standard A3-1987, quality is the totality of features and characteristics of a product or service that bear on its ability to satisfy implied or stated needs (Dale, 2003). From the organisational standpoint, those organisations that pursue ISO 9000 certification willingly and positively across a broad spread of objectives are more likely to report improved organisational performance. Customer pressure, however, is the most commonly cited motivating factor for pursuing ISO 9000 certification. These companies are less likely to report improved organisational performance (Terziovski, Power, & Sohal, 2003).



**Figure 1: Quality Management Practices, adapted from Flynn *et al.*, (1995).**

A quality management practice or system is viewed in different ways. ISO (2000) defines it as a “management system to direct and control an organisation with regard to quality”. Magnusson & Berggren (2001) gave a more comprehensive description of QMS and view it as a tool to control and improve the quality of a company’s product, which includes everything from methods and routines to organisation and responsibility distribution. This study interprets a QMS as a comprehensive practice that supports the assurance and improvement of quality (ISO, 2000). According to this interpretation of QMS, commonly recognised principles and

techniques, as described by Dean and Bowen (1994), are used to customise practices to fit the needs of a particular organisation. Every organisation has a general management system where the development can be graded on a scale according to different levels of adoption. In terms of the higher levels, organisations have achieved efficiency and effectiveness through continuous improvement and learning.

The purpose of a QMS is to establish an organisation's policies and to realise the contents of these policies through short- and long-term goals. The substance of a QMS often follows a PDCA cycle. The cycle is a continuous quality improvement model consisting of a logical sequence of four repetitive steps for continuous improvement and learning (Deming, 1986). The main purpose of this cycle is to start by planning and formulating concrete goals for the organisation. The next step is to put the action plans and programmes into action to reach these set goals, which is followed by checking that the goals have been obtained, and finally, further improve the organisation's processes (ISO, 2000). After a review of the available literature, this paper focuses on quality management practice construction by Flynn et al. (1995), regarding critical success factors, like human resource management, design of product, process approach, customer focus, and supplier relationship.

## 2. Sustainable Product Development

The modern concept of environmental sustainability goes back to the post-world war II period, when a utopian view of technology-driven economic growth gave way to a belief that the quality of the environment is linked closely to economic development. The relationship between economic development and environmental degradation was first placed on the international agenda in 1972, at the UN conference on the Human Environment. In *Our Common Future*, "sustainable development" is defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987).

Within the larger issue, industrial environmental protection has been subject to similar interest in the last decades (Johansson, Kisch, & Mirata, 2005). As Van Der Woerd and Van Den Brink (2004) stated, companies today have good reasons to feel overwhelmed by the number of various approaches to corporate sustainability and to its sister concepts. Encouragingly, a growing number of companies have realised the advantage of proactive sustainable practice. Companies, such as Daimler Chrysler and BMW, along with approximately 10 other companies from the automotive and energy industries, are involved in the Sustainability Mobility Project of World Business Council for Sustainable Development. Their focus is on issues such as new vehicle technologies, improved and alternative fuels, infrastructure, and future demand for passenger and freight transport.

Sustainable product development approach has varying roots, and therefore various meanings. This paper will only give a very limited discussion of sustainability in the literature considering the many roots and meanings that exist, and focus more on the evolution of the concept in an organisational context. Furthermore, the guidelines given by BS and development of ISO 20121 contents will be used. Two perspectives on the sustainability notion have played important roles in sustainability literature. Firstly is the Brundlandt perspective, based on the "Brundlandt definition" of sustainable development (WCED, 1987), which is "meeting the needs of the present generation without compromising the ability of future generations to meet their needs". The second perspective is based on triple-P (Elkington, 1994), which uses this perspective to consider an organisation as sustainable if a certain minimum performance is attained in the areas of people, plane, and profit. The main point is that the bottom line of an organisation is not only an economic one; an organisation is responsible for its social and environmental actions as well. From all these perspective, an organisation needs to find a balance between economic goals of profit and goals with regard to the social and ecological environment.

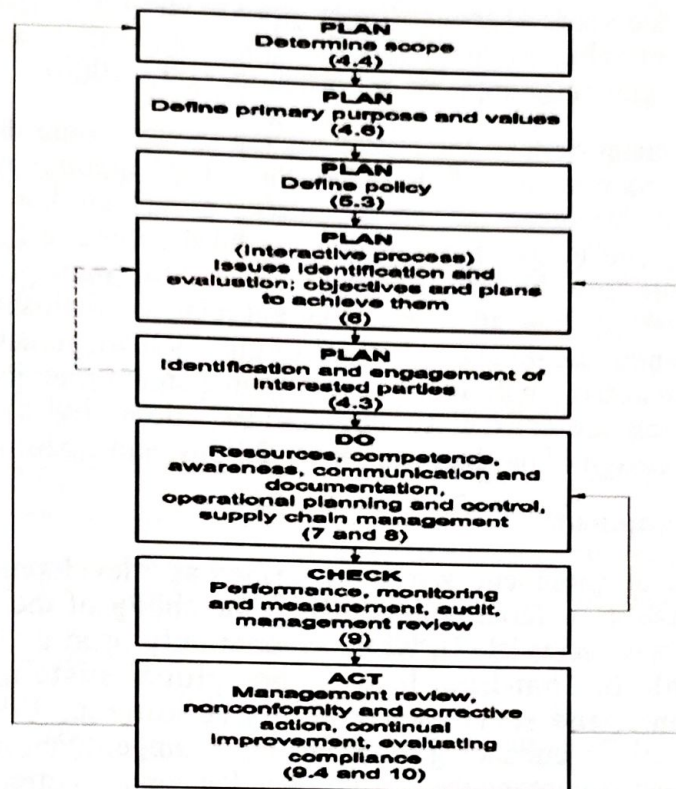


Figure 2: Flow of sustainable event management adopted from ISO 20121.

### 3. Conceptual Framework

This paper proposes a framework, as shown in Figure 3, related to the integration of quality management practices affecting organisational performance with sustainable product development as moderators in influencing the relationship.

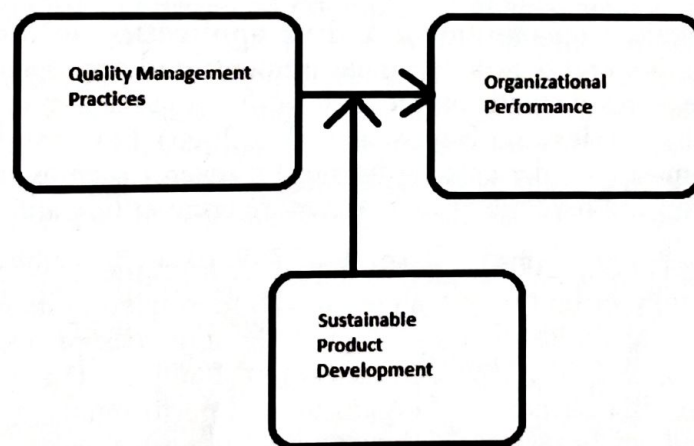


Figure 3: Framework of the conceptual model.

### 4. Theoretical Component

The main concern of this paper is determining the relationship of quality management principles and organisational performance with the moderator being sustainable product development. The quality of a product may be described in many ways. Most descriptions involve characteristics that are desired by the customers. In the beginning of the quality movement, the main objective was to minimise variability and reduce the number of defective products to satisfy the customer (Hansson & Klefsjo, 2003). The definition of quality by other authors is fitness for use (Juran, 1999); conformance to requirements (Crosby, 1984);

quality should be aimed at the needs of the customer, present and future (Deming, 1986); and the degree to which a set of inherent characteristics fulfils the requirements, i.e. needs or expectations that are stated, generally implied, or obligatory (ISO, 2000).

The evolution of quality management is sometimes argued to have gone through four stages: quality inspection, quality control, quality assurance, and total quality management (Dale, 2003). Foster and Jonker (2003) suggested that the quality movement has passed through its first and second generation and is now moving into the third generation. Foster and Jonker (2003) described the change into the third generation of quality management as when the organisation starts to analyse and manage the multi-lateral relations with actors in the external world. Extensive material about the three generations of quality management has not yet been published. In this study, the authors will adopt quality management practice, as suggested by Flynn *et al.*, (1995), which are critical success factors identified as human resource management, process, and design of product, supplier relations, and customer satisfaction.

### Sustainable Product Development

Definition of sustainability development is often described as "development that meets the needs of the present generation, without compromising the ability of the future generations to meet their own needs" (WCED, 1987); while a commonly used description of global sustainability is the triple bottom-line. It describes global sustainability as linked to environmental, economic, and social sustainability (Elkington, 1994). New product development is a core activity for enhancing profit business competitiveness in organisations. This is done by simultaneously improving the new product development effectiveness in making sure that the right things are done in the right ways (Ritzen & Beskow, 2001). However, the success of newly developed products is, consequently, a function of its cost, quality, lead time, and nowadays, ability to meet the demands of sustainability issues. Incorporating environmental features into product development also involves consideration of the "what" and "how" of product development (Ritzen & Beskow, 2001). The constructs of sustainable product development in this research are identified as context of management, involvement of people, support, plan, operation, performance evaluation, and improvement.

### Organisational Performance

Organisational performance measurement and its application to identify growth may encompass both quantitative and qualitative measurements and approaches. The variety and level of performance measures depends on the goal of the organisation or individual strategic business unit's characteristics (Hervani, Helms, & Sarkis, 2005). For example, when measuring performance, companies must consider existing financial measures such as return on investment, profitability, market share, and revenue growth at a more competitive and strategic level.

Also according to Hervani *et al.*, (2005), a performance measurement system may be unique to each individual organisation, or unit within an organisation, reflecting its fundamental purpose and its environment. Several studies had investigated the universal principles of performance measures (Adams, Sarkis, & Liles, 1995; Gunasekaran, Patel, & Tirtiroglu, 2001). For this study, the authors will use the measures of organisational performance, process performance, customer satisfaction, and newly measures of sustainability performance.

**Table 1: Organisational performance matrices, adapted from Merino and Cerio (2000).**

Authors	Organisational Performance Measures
Ebrahimpour & Johnson (1992)	Operational and Financial Performance
Flynn <i>et al.</i> , (1994)	Operational Performance (quality performance)
Adam (1994)	Operational and Financial Performance
Mann & Kehoe (1994)	Operational and Financial Performance

Powell (1995)	Finance Performance
Flynn et al., (1995a)	Operation Performance
Flynn et al., (1995b)	Operation Performance
Flynn et al., (1995c)	Operation Performance
Forza (1995)	Operation Performance
Lawler III et al., (1995)	Operation and Finance Performance
Ittner & Larcker (1996)	Operation and Finance Performance
Martinez (1996)	Operation and Finance Performance
Madu et al., (1996)	Operational Performance
Leal (1997)	Finance Performance
Forker (1997)	Operational Performance
Adam et al., (1997)	Operation and Finance Performance
Terziovski (1997)	Operation and Finance Performance
Choi & Eboch (1998)	Operational Performance and Customer Satisfaction
Wilkinson et al., (1998)	Several
Samson & Terziovski (1999)	Operation Performance, Customer, & Employer Satisfaction

**Table 2: Organisational performance, adopted from Hubbard (2004)**

Authors	Organisational Performance Measures
Hubbart (2004)	Finance Performance, Customer Performance, Internal Process Performance, Learning and Development Performance, Social Performance and Environmental Performance.

## 5. Conclusion

This study is proposing five fundamental principles of quality management practices that were adopted from Flynn *et al.*, (1995) and will try to investigate the effect of these principles on organisational performance. However, this study will also determine the strength of the influential relationship of sustainable product development, between the relationship of quality management practices and operational performance. Previous case studies by Nunes and Bennett (2010) had found that three big giant automotive makers have adopted environmental initiatives in their business with various own organisational efforts, and there are no systematic approaches implemented. Hopefully this paper might trigger some idea on relations between quality management principles, sustainable product development, and organisational performance. Focusing on quality management alone is not sufficient in today's business without considering sustainability issues. However, both issues need to be considered by the organisation as a whole. In summary, the theoretical framework portrayed in this paper is hoped to provide new dimensions for empirical investigation in the Malaysian automotive industry.

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