

## Chapter 50

# Green Manufacturing Practices and Performance among SMEs: Evidence from a Developing Nation

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### ABSTRACT

*Due to the rise in environmental awareness, green technologies and practices have become the conscientious imperative expected from all manufacturing industries. Consequently, environmental initiatives are becoming an essential part of the strategic planning in organizations, including the small and medium enterprises (SMEs). Thus, the objectives of this study were to determine the extent of implementation in green manufacturing practices among the SMEs as well as to examine the relationship between those practices and manufacturing performance. Data was collected via a survey from 544 SMEs across all types of industries located throughout Malaysia. Results of the analysis showed that there is an encouraging level of implementation in green practices among the SMEs, with the optimization of processes to reduce solid waste being the top practice. The results also revealed that green practices within the inbound and production phase of the manufacturing lifecycle significantly affected manufacturing performance but not practices within the outbound phase.*

### INTRODUCTION

Manufacturing is an undeniably important sector for many countries due to its significant contribution to the economy and creation of enormous job prospects. For developing countries like Malaysia,

it is the largest contributor to the national economy (BNM, 2011). The manufacturing sector also contributes indirectly to the economy through synergistic relationships with other economic sectors such as trading, financial, transportation and services (Islam & Karim, 2011).

Amidst all the attention on its economic importance, the environmental impact of manufacturing

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industries is sometimes overlooked. In reality, manufacturing organizations have a direct impact on the natural environment (Vachon & Klassen, 2008). Manufacturing industries consume significant amounts of resources and generate large volumes of waste. Over the span of 3 decades (1974 to 2004), the worldwide energy consumption of manufacturing industries had increased by 61%. Manufacturing industries account for nearly a third of today's global energy usage and is responsible for 36% of global carbon dioxide (CO<sub>2</sub>) emissions (IEA, 2007) which is largely blamed for the problem of global warming. In the wake of such problems, there has been a rise in the public's environmental consciousness. Due to the rise in environmental awareness, we are currently in the midst of a "green revolution" where green technologies and sustainable business practices have become the conscientious imperative expected from all manufacturing industries. As a result, environmental issues are becoming an essential part of the strategic planning in organizations.

Apart from conserving the environment, manufacturing industries are set to benefit from implementing green technologies and sustainable business practices because it enables them to establish and maintain a competitive position in the marketplace. The globalization of world trade and the escalating demands for better, 'greener' products and services has intensified competition among manufacturing industries worldwide. It is unsurprising then that manufacturing industries would turn to adopt green technology and practices as a strategy to differentiate themselves from their competitors. Yet, how much is truly known about the involvement of manufacturing companies in green manufacturing practices? Several concerns arise pertaining to this area.

*To what extent do manufacturing companies, specifically the small and medium ones implement green manufacturing practices?*

Past literature in the area of manufacturing or supply chain leaned towards large companies and their subsidiaries, and primarily those in countries such as the USA, Japan and in Europe.

As a result, small and medium enterprises (SMEs) have not received sufficient attention from the research community. In actual fact, SMEs are just as important as the large companies in contributing to export earnings, generating export employment opportunities, strengthening industrial linkages and penetrating new markets (International Business Publication, 2007). They play a crucial role in the economic activity of both developed as well as developing countries as a spawning ground for future entrepreneurs (Islam & Karim, 2011). However, compared to large companies, Tipuric and Galetic (1998) stated that SMEs are more flexible and more adaptable in their business behaviour and make business decisions at a faster pace. Given this fact, it would appear that SMEs are more partial towards adopting green manufacturing practices than large companies. For SMEs in developing countries such as Malaysia which adopt green manufacturing practices, the question that arises is the level of implementation of the green manufacturing practices among these SMEs.

*Would the adoption of such green manufacturing practices lead to better manufacturing performance?*

Researchers note that manufacturing practices have a significant impact on manufacturing performance (Dale & Lightburn, 1992; Karim et al., 2008a,b; Lai, 2003). There was a time when better quality management practices were the industry norm and were proven to have a direct, positive influence on company performance (Phillips et al., 1983). However, manufacturing organizations today can no longer rely entirely on previously proven quality practices as these are no longer

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