

**SUSTAINABLE ENVIRONMENTAL MANUFACTURING
PRACTICES AND FIRM PERFORMANCES: MODERATING
ROLE OF ENVIRONMENTAL REGULATION AND PERCEIVED
BENEFITS**

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FIRM PERFORMANCES: MODERATING ROLE OF ENVIRONMENTAL
REGULATION AND PERCEIVED BENEFITS**

BY

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ABSTRACT

More attention has been shifted to the environmental impacts of manufacturing companies on firm performance as sustainable environmental manufacturing practice has become an issue of concern to most researchers and practitioners. Theoretical evidence from previous studies showed that a considerable amount of attention has been given to environmental issues in academic studies in the past years and the link between environmental practices and performance of firms has been widely discussed, which results into different views. Thus, the relationship between sustainable environmental practices and firm performance remains inconclusive. This study investigates the impact of sustainable environmental manufacturing practices (SEMP) on firm performance through the moderating effects of perceived benefits (PB) and environmental regulation (ER). In addition, the relationships between the antecedent factors and SEMP were investigated. Data was collected from manufacturing companies in Malaysia using a cross sectional study design and stratified random sampling method. 103 usable questionnaires were collected by using a mail survey method and analysed with SmartPLS-SEM. The result indicated that five out of the 12 hypothesized relationships (both the direct and moderating hypotheses) were supported. Specifically, the study found that top management commitment and stakeholder pressure positively influence sustainable environmental manufacturing practices and that sustainable environmental manufacturing practice has a direct positive influence on environmental performance. The study also established that perceived benefits moderates the relationship between sustainable environmental manufacturing practice and operational performance, while the relationship between sustainable environmental manufacturing practice and environmental performance is moderated by environmental regulation. In addition, it was found that sustainable environmental manufacturing practice is still regarded as ethical behaviour and yet to be considered as a strategic factor of firms in Malaysia. Hence, important implication of this study to the environmental regulatory policy makers, academics and manufacturing practitioners in Malaysia is to create more awareness on the perception of SEMP as a strategic factor towards achieving better firm performance. It also reveals the need for environmental policy makers and the concerned authorities to revisit the environmental regulations on manufacturing practices to provide supportive environmental policies that will enhance a better firm performance in the Malaysian manufacturing industry.

Keywords: antecedent factors of SEMP, environmental regulation, firm performance, sustainable environmental manufacturing practices and perceived benefits.

ABSTRAK

Pada masa kini, lebih tumpuan diberikan kepada kesan alam sekitar terhadap prestasi syarikat pembuatan. Ini adalah kerana amalan pembuatan alam sekitar mampan telah menjadi satu isu yang menarik perhatian kebanyakan penyelidik dan pengamal industri. Bukti-bukti teori daripada kajian sebelum ini menunjukkan bahawa sejumlah besar perhatian telah diberikan kepada isu-isu alam sekitar dalam kajian akademik. Perhubungan di antara amalan alam sekitar dan prestasi firma juga telah dibincangkan secara meluas dan telah menghasilkan pandangan yang berbeza. Oleh itu, hubungan antara amalan alam sekitar yang mampan dan prestasi firma masih belum meyakinkan. Kajian ini mengkaji kesan amalan pembuatan alam sekitar mampan (SEMP) ke atas prestasi firma melalui kesan menyederhana manfaat yang dirasakan (PB) dan peraturan alam sekitar (ER). Di samping itu, hubungan antara faktor-faktor anteseden dan SEMP dikaji. Data dikumpulkan daripada syarikat-syarikat pembuatan di Malaysia dengan menggunakan reka bentuk kajian rentas dan kaedah persampelan berstrata rawak. 103 borang soal selidik telah dikumpulkan dengan menggunakan teknik kaji selidik melalui pos dan dianalisis dengan menggunakan SmartPLS-SEM. Hasil menunjukkan bahawa lima daripada 12 hubungan hipotesis (kedua-dua hipotesis langsung dan menyederhana) telah disokong. Secara khusus, kajian ini mendapati komitmen pengurusan atasan dan tekanan dari pihak berkepentingan secara positif mempengaruhi amalan pembuatan mampan alam sekitar (SEMP) dan juga, amalan pembuatan mampan alam sekitar mempunyai pengaruh yang positif secara langsung terhadap prestasi alam sekitar. Kajian ini juga membuktikan manfaat teranggar menyederhanakan hubungan antara SEMP dan prestasi operasi, manakala hubungan antara SEMP dan prestasi alam sekitar disederhanakan oleh peraturan alam sekitar. Di samping itu, kajian ini mendapati bahawa amalan pembuatan mampan alam sekitar masih dianggap sebagai tingkah laku beretika dan belum dianggap sebagai faktor strategik firma di Malaysia. Oleh itu, implikasi penting kajian ini kepada penggubal dasar peraturan alam sekitar, ahli akademik dan pengamal pembuatan di Malaysia adalah, mereka perlu membentuk lebih banyak kesedaran mengenai tanggapan SEMP sebagai faktor strategik ke arah mencapai prestasi firma yang lebih baik. Ia juga mendedahkan keperluan untuk penggubal dasar alam sekitar dan pihak yang terbabit untuk mengkaji semula peraturan alam sekitar berkaitan pengamalan pembuatan untuk menyediakan dasar menyokong alam sekitar yang akan meningkatkan prestasi firma dalam industri pembuatan Malaysia.

Kata kunci: factor-faktor anteseden SEMP, peraturan alam sekitar, prestasi firma, amalan pembuatan alam sekitar mampan dan manfaat teranggar.

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LIST OF ABBREVIATIONS

AVE	Average Variance Extracted
BNM	Bank Negara Malaysia
BOD ₅	Biochemical Oxygen Demand
CES	Compendium of Environmental Statistics
CFA	Confirmatory Factor Analysis
CMV	Common Method Variance
CR	Composite Reliability
DOE	Department of Environment
EIA	Environmental Investigation Agency
EP	Environmental Performance
EQA	Environmental Quality Act
ER	Environmental Regulation
ESTS	Environmental Statistics Time Series
FMM	Federation of Malaysian Manufacturer
FP	Financial Performance

GDP	Gross Domestic Product
GHG	Greenhouse Gas
GoF	Goodness of Fit
ISIC	International Standard industrial Classification
ISO	International Standard Organization
MIP	Malaysia Investment Performance
NIMRC	Nottingham Institute of Innovative Manufacturing Center
NRBV	Natural Resource Based View
OECD -	Organization for Economic Co-operation and Development
OP	Operational Performance
PB	Perceived Benefits
PC	Public Concern
PLS-SEM	Partial Least Square Structural Equation Modelling
RBV	Resource Based View
SEM	Structural Equation Modelling
SPSS	Statistical Package for Social Sciences
STML	School of Technology Management and Logistics
UUM	Universiti Utara Malaysia

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The beginning of the new millennium witnessed an increasing awareness of the impact of manufacturing firms on the environment, thereby enhancing the implementation of sustainable manufacturing practices that prevents environmental degradation (Seidel, Shahbazpour & Siedel, 2007; Millar & Russel, 2011; Anis & Nurul, 2012). Various labels such as environmentally conscious manufacturing (Richards, 1994) or Green manufacturing (Rusinko, 2007) have given birth to the concept of sustainable environmental manufacturing practices which is aimed at minimizing the environmental impact linked to manufacturing activities. Manufacturing firms contribute positively to economy in term of gross domestic product (GDP) and employment opportunities, but their operational activities have detrimental impacts on the environment.

Environmental problem has been linked to the operational activities of manufacturing firms (Gutowski, Branham, Dahmus, Jones, Thiriez, & Sekulic, 2009). Traditionally, association exists between manufacturing firms and the undesirable environmental negative impacts (Frosch & Gallopoulos, 1989; Despeisse, Ball & Evans, 2012). As such, environmental practices have thereby become a vital global issue that creates challenges for the society and manufacturing practitioners (Jovane, Yoshikawa,

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