ENVIRONMENTAL MANAGEMENT ACCOUNTING: A STUDY OF MANUFACTURING COMPANIES IN MALAYSIA

BY

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ABSTRACT

Interest in managing environmental issues has important implications on the practice of management accounting among business organizations. Environmental management accounting (EMA) promises better internal management and decision making as it explicitly addresses environmental information, particularly pertaining to costs and revenue. EMA has a financial component known as monetary environmental management accounting (MEMA) as well as a physical component known as physical environmental management accounting (PEMA). The objectives of this study are twofold; first, to examine factors that influence EMA adoption, and second, to investigate the relationship between environmental performance, economic performance and EMA adoption. By utilizing institutional theory and contingency theory, this study investigates the influence of institutional pressure (i.e. coercive isomorphism, mimetic processes and normative pressure), size, environmental sensitivity and TMC on EMA adoption level. Based on the argument that environmental-related protection activities may be a source of competitive advantage and economic opportunity, it is also proposed that environmental performance affects economic performance via the mediating variable EMA. Accordingly, better environmental performance leads to a high EMA adoption level, which, in turn, increases economic performance. The respondents of this study consisted of 74 accountants and 88 environmental managers from manufacturing companies in Malaysia. To test the proposed relationships, the study adopts an explanatory mixed methods research approach. In this study, data is first collected using a mail questionnaire followed by semi-structured interviews with a few respondents who participated in the survey. The results of the multiple regression analyses indicate that normative pressure and TMC influence EMA adoption level. However, the multiple regression analyses did not provide enough evidence to support the influence of mimetic processes, coercive isomorphism, size and environmental sensitivity on EMA adoption level. The results of the mediated regression analyses offer partial support for the hypothesized relationship between EMA, environmental performance and economic performance. Next, the post survey interviews provide some support for the survey results on normative pressure, TMC and mimetic processes. The findings from the interviews also suggest some explanation on the unexpected survey results on coercive isomorphism, size and environmental sensitivity. Additionally, the interviews uncovered several reasons for the limited role of EMA as a mediating variable in the proposed relationships. Overall, the findings of this study are particularly relevant in light of the many roles that can be played by the policy makers, especially the government, accounting educators and professional bodies in promoting EMA. More importantly, the findings of this study have implications for the benefits of EMA in supporting eco-efficiency for companies moving towards a sustainable business environment.

ملخص البحث

إن الأهتمام بأمور إدارة البيئة له تضمنات مهمة على ممارسات إدارة المحاسبة وسط كل أنظمة الأعمال الأخرى. إن إدارة المحاسبة البيئية تتعهد بإدارة داخلية و صنع قرار أفضل لأنها تخاطب بوضوح المعلومات البيئية خاصة المتعلقة بالتكاليف والعوائد. إن إدارة المحاسبة البيئية النقدية هي أحد العناصرالمالية المكونة لإدارة المحاسبة البيئية وإن إدارة المحاسبة البيئية المادية هي أحد العناصرالمادية المكونة لإدارة المحاسبة البيئية. إن أهداف هذه الدراسة ثنائية: اولاً, فحص العوامل التي تؤثر على تبني إدارة المحاسبة البيئية و ثانياً التحقيق في العلاقة بين الأداء البيئي, الأداء الأقتصادي وتبني إدارة المحاسبة البيئية. أستخدمت النظرية التأسيسية و النظرية الأحتمالية في هذه الدراسة للتحقيق من تأثير الضغط المؤسسي(التشاكل الأكراهي, عملية التنكر البيئي و الضغط المعياري), الحجم, حساسية البيئة و(تي أم سي) في مستوى تبنّي إدارة المحاسبة البيئية. إستناداً على الجدل السائد حول النشاطات الوقائية المتعلقة بالبيئة بأنها قد تكون مصدر مصلحة تنافسية و فرصة إقتصادية. تقترح الدراسة بأن الأداء البيئي يؤثر على الأداء الإقتصادي و ذلك خلال توسط المتغير إدارة المحاسبة البيئية. وفقا لذلك, فإن الأداء البيئي الأفضل يقود الى تبني مستوى أعلى لإدارة المحاسبة البيئية وبالتالي الى إزدياد في الأداء الأقتصادي. المستجيبون لهذه الدراسة هم أربعة و سبعون محاسباً و ثمانية و ثمانين مدراء للبيئة من شركات تصنيع بماليزيا. لدراسة العلاقة المقترحة, تبنت هذه الدراسة طريقة أساليب البحث المتنوعة التفسيرية. أعطت هذه الدراسة الحجم الأكثر ثقلاً الى الجزء المتعلق بالفحص البريدي بينما المعاينة التي تمت بعد الفحص ساعدت في شرح و تفسير نتائج الفحص. تدل نتائج التحليل الترددي المضاعف بأن الضغط المعياري و(تي أم سي) لهم تأثير على مستوى تبني إدارة المحاسبة البيئية. ومع ذلك فإن التحليل الترددي المضاعف لم يقدم إثباتات لدعم مدى تأثير عملية التنكر البيئي, التشاكل الإكراهي, الحجم و حساسية البيئة على مستوى تبني إدارة المحاسبة البيئية، إن نتائج التحليل الترددي المضاعف تعرض دعماً جزئياً للعلاقة المفترضة بين إدارة المحاسبة البيئية، الأداء البيئي والأداء الإقتصادي. بعد ذلك، فقد أبدت المعاينة التي تمت بعد الفحص بعض الدعم لنتائج الفحص قائمة على الضغط المعياري،(تي أم سي) وعملية التنكر البيئي. وقد إقترحت نتائج المعاينات بعض شرح نتائج الفحص الغير متوقعة على التشاكل الإكراهي، الحجم وحساسية البيئة. زيادة عن ذلك، كشفت المعاينات أسباب عديدة للدور المحدود لإدارة المحاسبة البيئية في أن يكون متغير وسطي في العلاقات المقترحة. في العموم، فإن نتائج هذه الدراسة هي بالتحديد متعلقة في ضوء أدوار عدة تتعلق بصناع السياسة، خاصة الحكومة، أساتذة المحاسبة وجهات مختصة في ترويج إدارة المحاسبة البيئية. والأهم من ذلك فإن نتائج هذه الدراسة لها تضمنات إلى صالح إدارة المحاسبة البيئية في دعم فعالية البيئة للشركات التي تهدف لبيئة عملية دائمة.

APPROVAL PAGE

The thesis of Dayana Binti Jalaludin has been approved by the following:

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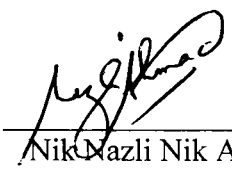

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DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any degrees at IIUM or other institutions.

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All praise is due to Allah whom has showered me with blessings, grace and mercy throughout this long memorable voyage.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ABC	Activity based costing
ACCA	The Association of Chartered Certified Accountants
ANOVA	Analysis of variance
BNM	Bank Negara Malaysia (Central Bank of Malaysia)
CIMA	Chartered Institute of Management Accountants
COD	Emission of chemical oxygen demand (kt per tonne)
CV	Control variable
DOE	Department of Environment Malaysia
DV	Dependent variable
EEGECOST	Environmental engineering group environmental costing
EHS	Environmental, health and safety
EIA	Environmental impact assessment
EM	Environmental manager
EMA	Environmental management accounting
EMS	Environmental management system
ERG	Environmental reporting guidelines for Malaysian companies
EU	European Union
FFM	Federation of Malaysian Manufacturers
FRS	Financial reporting standards
GDP	Gross domestic products
HSE	Health, safety and environment
ISO	International organization for standardization
IFAC	The International Federation of Accountants
INSAP	Institute of Strategic Analysis and Policy Research Malaysia
IV	Independent variable
LCC	Lifecycle costing
MAS	Management accounting systems
MASB	Malaysian Accounting Standards Board
MASRA	Malaysia Sustainability Reporting Awards
MCCG	Malaysian Code on Corporate Governance
MCS	Management control systems
MIA	Malaysian Institute of Accountants
MIDA	Malaysian Industrial Development Authority
MATRADE	Malaysia External Trade Development Corporation
NACRA	National annual corporate report awards
NIE	New institutional economics
NIS	New institutional sociology
NO_x.	Emission of nitrogeneous oxides (kt per tonne)
OHS	Occupational, health and safety
OIE	Old institutional economics
PCA	Principal component analysis
PhD	Doctor of Philosopy
PMS	Performance measurement systems
QSI	Questionnaire survey set I

CHAPTER ONE

AN OVERVIEW OF THE STUDY

1.1 BACKGROUND

Interest in accounting for the environment has increased among business entities in the recent past (Burnett and Hansen, 2008; Matthews, 1997). Parallel to the increase of environmental concerns throughout the world, today's progressive companies face the challenge of providing environmental related information to stakeholders both within and outside their organizations (Jaffe, Peterson, Portney and Stavins, 1995; Judge and Elenkov, 2005). The mission of sustainable development and eco-efficiency, along with the practice of environmental management and the adoption of environmental management systems (EMS), have intensified the need for accounting to act as a medium that adds value to the business. Indeed, prior literature suggests that a management accounting system that addresses environmental costs and information will simultaneously improve both environmental and economic performance (Ranganathan and Ditz, 1996; Schaltegger and Figge, 2000; Kitzman, 2001; Sarkis, 2001; Schaltegger et. al. 2003).

Environmental accounting, particularly environmental management accounting (EMA), promises better internal management and decision making as it helps companies to track and manage their physical and monetary resources as well as identify opportunities for cost savings associated with the environment (Bennett, Bouma and Walters, 2002; Jasch, 2006b). In brief, environmental management accounting (EMA) is the part of management accounting that explicitly identifies, classifies, measures, analyzes and reports environment related information, especially

those that pertain to cost and revenue. It exists as a support to the management accounting and environmental management systems of the organization (Bennett et. al. 2002). The adoption of EMA may vary from basic documentation of environment-related information to the establishment of an environmental management accounting system in the organization. Accordingly, it ranges from simple adjustments to existing accounting systems to more integrated EMA practices that link the physical and monetary information systems (Jasch, 2006a).

In recent years, EMA has received considerable attention due to developments such as promotions by international governments and bodies on environment-related efforts, acknowledgement of monetary consequences relating to environmental issues and increasing pressure to maintain environment-related corporate legitimacy (Burritt, 2004; Deegan, 2002). Guidance documents on EMA such as the UNDSD's Environmental Management Accounting: Procedures and Principles (United Nations Division for Sustainable Development, 2001) and the IFAC's International Guidance Document: Environmental Management Accounting (International Federation of Accountants, 2005) were developed to promote EMA among the public worldwide and more importantly provide a better understanding concerning EMA definitions and the general framework.

Across the globe, studies on EMA have been conducted within different sectors using various perspectives (Bennett et. al. 2002; Bennett, Rikhardsson. and Schaltegger, 2003; Jasch, 2006a), with considerable attention given to the manufacturing industry (Kim, 2002; Thurm, 2002; Kokubu and Kurasaka, 2002; Seuring, 2003; Jasch, 2006b; Jasch and Lavicka, 2006; Gale, 2006a; de Beer and Friend, 2006). In comparison to the service industry, the manufacturing industry generates obvious environmental impact due to its nature of operations (Wee and

Quazi, 2005; Chang, 2007). Recognizing this important point, the present study attempts to examine EMA adoption in manufacturing companies operating in Malaysia.

The manufacturing sector is a substantial source of economy for Malaysia. It is the second largest contributor to the country's economy after the service sector, with a 29.2 percent of GDP share (BNM, 2009). Approximately 18 percent of the Malaysian labour force was employed by the manufacturing sector in 2008 (INSAP, 2009). Starting from the 1970s, Malaysia has begun to experience a transition of its economy from reliance on mining and agriculture to manufacturing (Wikipedia, 2009). At present, the manufacturing sector is the country's leading export sector, contributing, on average, about 70 per cent of exports. A third of Malaysia's total export market is absorbed by the USA, Japan and EU countries. In 2008, the electronics and electrical products were Malaysia's largest contributor to total exports, accounting for a 38.3 percent share (MATRADE, 2009). Other major exports of the manufacturing sector include palm oil based products, timber based products, petroleum based products and rubber based products (INSAP, 2009).

In Malaysia, the Department of Environment (DOE) under the Ministry of Natural Resources and Environment is the enforcement agency that oversees environmental issues. Accordingly, the main role of the DOE is to prevent, control and abate pollution through the Environmental Quality Act 1974 and its 34 subsidiary legislations. At the moment, any non-compliance with environmental regulations in Malaysia may lead to the risk of imprisonment for a maximum of five years and a fine of RM500,000. Beginning 1 April 1988, the environmental impact assessment (EIA) order came into force in Malaysia. The EIA is a study to identify, predict, evaluate and communicate information about the impact on the environment of a proposed

project. Additionally, it also details the mitigating measures before project approval and implementation. At present, the EIA study is compulsory for manufacturing companies operating in industries such as chemicals, petrochemicals, non-ferrous, non-metallic, iron and steel, and pulp and paper industry (DOE, 2008; MIDA, 2009).

For the ninth Malaysia plan period (2006-2010), the Malaysian government continues to emphasize sustainable resource planning and conservation. Among the major policy actions listed in the key action plans are improving sufficiency and sustainability of energy supply and promoting environmental protection and sustainable resource management (EPU, 2006). At present, Malaysia provides various incentives for environmental management. Manufacturing companies in Malaysia, which are involved in activities such as forest plantation projects; storage, treatment and disposal of toxic and hazardous wastes; waste recycling; energy conservation; energy generation using renewable energy resources; and renewable energy generation for own consumption, qualify for tax exemption and investment tax allowance. Furthermore, companies using environmental protection equipment may also be eligible for accelerated capital allowance (MIDA, 2009).

Since 1999, the Malaysian Accounting Standards Board (MASB) has incorporated new standards to encourage greater disclosure of environment-related financial information. For instance, the FRS 101[1] makes explicit reference to 'environmental reports and value added statements' particularly in industries where environmental factors are significant. Another accounting standard, the FRS 137,[2] sets out accounting and disclosure requirements for the recognition of contingent liabilities and assets, including environmental circumstances (Malaysian Accounting Standards Board, 2009). In 2000, the Malaysian Code on Corporate Governance

[1] Formerly known as MASB 1.
[2] Formerly known as MASB 20, the standard was introduced in 2001.

(MCCG) was introduced by the Malaysian Institute of Corporate Governance. The MCCG specifies that listed companies should supply the board with not only financial information but also other non-financial information including environmental performance information (Securities Commission, 2007; Good Governance in Malaysia- Code on Corporate Governance, 2008). Subsequently, the Environmental Reporting Guidelines for Malaysian Companies (ERG) was launched in 2003 by The Association of Chartered Certified Accountants (ACCA)[3] explaining environmental reporting, its evolution and general content (ACCA, 2003). As a continuation, the ACCA then released the Sustainability Reporting Guidelines (SRG)[4] for Malaysian Companies in 2005. The SRG suggests core indicators on background, components and application for sustainability reporting, which encompasses the three sustainability criteria i.e. environmental, social and economic (ACCA, 2005). From 2007, all public listed companies in Malaysia are now required to disclose their corporate social responsibility (CSR). The Bursa Malaysia CSR Framework looks at four main focal areas for CSR i.e. the environment, the workplace, the community and the marketplace[5] (Bursa Malaysia, 2009). Additionally, there are also various awards that acknowledge environmental related accomplishments of the business sector in Malaysia. Among them is the Prime Minister's Hibiscus Award[6] which recognizes exemplary environmental achievements (Malaysia's Premier Environmental Award,

[3] The ERG was collaboration between ACCA, DOE and Ministry of Natural Resources and Environment.
[4] The SRG is endorsed by Securities Commission, DOE and Ministry of Natural Resources and Environment.
[5] In no order of priority.
[6] The award is endorsed by the Ministry of Natural Resources and Environment and jointly organized by Business Council for Sustainable Development Malaysia, Environmental Management and Research Association of Malaysia, Federation of Malaysian Manufacturers and Malaysian International Chamber of Commerce and Industry.

2008). In terms of environmental reporting, the MASRA[7] (The ACCA Malaysia Sustainability Reporting Awards, 2009) award and NACRA[8] award (The National Annual Corporate Report Award) (NACRA, 2008) concede excellent communication in relation to environmental issues via the company's annual report.

The escalating concerns on the environment as well as the progress in accounting itself provide signals for the substantial need of a part in the management accounting system that explicitly addresses environmental issues. In Malaysia, the increased awareness amongst government and professional organizations is evidenced by the enthusiasm towards efficient management of environmental related information (ACCA, 2005; EPU, 2006; DOE, 2008; Bursa Malaysia, 2009). Despite the abovementioned developments, uncertainty about the acceptance and benefits of EMA in Malaysia creates doubt as to whether EMA will become an important component of management accounting practices and fulfil its potential in inspiring eco-efficiency. Thus, recognizing the paucity of EMA research on manufacturing organizations in Malaysia, the current study examines the adoption of EMA among manufacturing companies in Malaysia. Drawing from institutional theory (the new institutional sociology (NIS) perspective) and contingency theory, the present study considers the effect of institutional, political and economic reasons for EMA adoption, focusing on four selected factors i.e. institutional pressure, size, environmental sensitivity and top management commitment to environmental management (TMC). Prior studies have linked these factors to contemporary accounting or environmental management practices. Consistent with the abovementioned view, the present study examines the

[7] The MASRA award, previously known as MESRA award was first introduced by ACCA in year 2002.

[8] The NACRA award is jointly organized by Bursa Malaysia, Malaysian Institute of Accountants, Malaysian Institute of Management and The Malaysian Institute of Certified Public Accountants, was launched in year 2000.

influence of institutional pressure, size, environmental sensitivity and TMC, on EMA adoption.

A number of prior studies have claimed that EMA, as it explicitly treats environmental costs and/or tracks environmental related monetary and physical information, allows for a better integration of the environmental information into the existing accounting systems (Verschoor and Reijnders, 2001; Deegan, 2003; Jasch, 2003; De Palma and Csutora, 2003; de Beer and Friend, 2006; Gale, 2006a; Jasch and Lavicka, 2006 Staniskis and Stasiskiene, 2006). Thus, interestingly EMA may provide some explanation as to how or why there could be a positive effect of environmental performance towards economic performance. Nevertheless, little is known about the role of EMA in highlighting the potential economic benefits that subsequently follow environmental performance achievements. Given this situation, the present study seeks to identify whether EMA exists as a mediator in the environmental-economic performance relationship. The next section (section 1.2) explains the motivation for the study. Section 1.3 details the objectives of the study. The subsequent sections present the scope (section 1.4) and contribution (section 1.5) of the study. Finally, yet importantly, section 1.6 specifies the structure of the thesis.

1.2 MOTIVATION FOR THE STUDY

Over the years, there has been increasing attention on the identification of approaches to deal with environmental concerns. In Malaysia, companies are coming under growing pressure to demonstrate good governance and accountability when dealing with environmental issues. From 2007, it is mandatory for public listed companies in Malaysia to disclose their social corporate responsibility, which includes the environmental aspect. Furthermore, the revision of accounting standards (MASB 1

and MASB 20) and the introduction of MCCG, as well as the release of ESG and SRG, have resulted in the uptake of environmental reporting as an important element in annual reporting. Besides facing growing demands for more environmental disclosure, companies in Malaysia are now challenged to carry greater corporate responsibility. Acknowledging the importance of sustainable development, Malaysia, although not as aggressive as the US and the European countries, has mandated for better environmental management practices by introducing the environmental impact assessment (EIA) study; providing various environmental related incentives in the form of tax exemptions and allowances; and enforcing higher penalties for non-compliance with environmental regulations. A number of companies in Malaysia, in their attempt to exhibit recognizable commitment towards environmental stewardship opted to gain the ISO14001[9] certification. By December 2007, the number of ISO14001 certificates in Malaysia totalled 667, revealing a leap of 171 percent from the number of ISO14001 certificates in Malaysia during December 2004 (ACNielsen, 2007).

The abovementioned developments are encouraging companies in Malaysia to question the viability of their environmental management practices. To survive in the long run, companies need to move in the right direction where there is consensus between their environmental and economic achievements. Clearly, an accounting system such as EMA that appropriately considers both environmentally induced financial data as well as environmental impact data is important. Accordingly, comprehensive incorporation of EMA into the environmental management process will allow the integration of environmental information into various aspects of the company's management activities including goal-setting, steering, implementation

[9] ISO14001 give requirements for environmental management systems. It is a well known and widely implemented standard that is used worldwide by businesses and organizations.