



ADOPTION OF ENVIRONMENTAL MANAGEMENT
ACCOUNTING: AN INVESTIGATION OF COMPANIES
IN ENVIRONMENTALLY SENSITIVE INDUSTRIES

BY

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ABSTRACT

Mounting awareness among various stakeholders of environmental management issues has motivated companies to place sustainability development on their business agenda. However, the unavailability of a system that can capture environmental concerns has hindered companies from identifying opportunities for improving their environmental performance. The role of accounting as a tool to address environmental problems therefore has become critical. The use of environmental accounting, particularly environmental management accounting (EMA), will allow management to identify ways for more efficient processes and better consumption of resources that may lead both to positive environmental and to economic performance. By utilising survey and semi-structured interviews to gain evidence from the practitioner's view, this study contributes to outlining the extent of EMA diffusion among environmentally-sensitive industries in Malaysia, the motivation for the uptake of the practice, the effects of the adoption on firm performance and problems/challenges related to its adoption. Diffusion of Innovation (DOI) and Neo-Institutional Sociology (NIS) perspective provides a theoretical background for this empirical study. DOI Theory suggests that technical and organisational factors are relevant for EMA adoption, while NIS stresses the part that environmental or external factors play in such a phenomenon. The correlation test suggests that all technical, organisational and institutional contexts play significant roles in EMA diffusion. Specifically, the perceived relative advantage of EMA, community pressure, regulatory pressure, normative pressure, multi-nationality status, the existence of an internal champion and top management's support are positively associated with the diffusion stage of EMA. Further logistic regressions tests were conducted to look at how EMA moved from one stage of diffusion to another within firms. While the existence of an internal champion caused firms to consider EMA, internal stakeholders' pressure and top management's support were found to be the factors that could move EMA from consideration stage to adoption stage. This paper traces the progress of EMA in Malaysia from as early as 1998. Even though the findings show that the pace of EMA diffusion is slow, the number of adopters is growing, thus implying the potential of EMA to be adopted in a wider context in future; forced selection may justify the faster pace of adoption. Problems related to lack of knowledge and inadequate expertise among accountants are found to be barriers for the practice to be widely diffused. This suggests that pressure for EMA adoption may stem from normative isomorphism. Furthermore, the case for introducing EMA is always put on cost-benefit ground, which accountants consider as difficult to be justified. As accountants place greater consideration on these impediments, interest in EMA wanes. This indicates the need for professional bodies and universities to integrate EMA into their coursework and training.

ملخص البحث

إنَّ ارتفاع الوعي بين مختلف أصحاب المصلحة في القضايا الإدارية البيئية قد حفزت الشركات على وضع التنمية المستدامة ضمن جداول أعمالهم. إلا أنَّ غياب نظام واضح يمكن الشركات من حصر الأبعاد البيئية قد أعاق الشركات من تحديد الفرص المتاحة لتحسين أدائها البيئي. حيث أصبح دور المحاسبة كأداة لمعالجة المشاكل البيئية أمراً شديداً الأهمية. وأيضاً فإنَّ استخدام المحاسبة البيئية، لاسيما محاسبة الإدارة البيئية (EMA)، سيتيح بدوره للإدارة تحديد طرق بديلة لعمليات أكثر كفاءة واستهلاك أفضل للموارد، والتي قد تؤدي إلى نتائج إيجابية في الأداء البيئي والاقتصادي. وعن طريق استخدام أسلوب المقابلات شبه المنظمة في إجراء مسح للممارسين ذوي الصلة تهدف هذه الدراسة إلى التحقق من مدى انتشار استخدام محاسبة الإدارة البيئية (EMA) من وجهة نظر الممارسين خاصة في القطاعات الحساسة والمؤثرة على البيئية في ماليزيا، والتعرف على الدوافع وراء الإقبال على هذه الممارسة، وآثار تبني محاسبة الإدارة البيئية (EMA) على أداء الشركة والمشاكل أو التحديات المتعلقة بهذا التبني والتطبيق. وذلك باستخدام نظرية نشر الابتكار (DOI) ونظرية المؤسسة الجديدة في علم الاجتماع (NIS)، والتي توفر الخلفية النظرية لهذه الدراسة. حيث تشير نظرية نشر الابتكار إلى أنَّ العوامل الفنية والتنظيمية ذات صلة وثيقة مع تبني EMA وتطبيقه، في حين تسلط نظرية NIS الضوء على دور العوامل البيئية أو الخارجية في تبني EMA وتطبيقه. وتشير نتائج اختبار الارتباط إلى أنَّ كل السياقات الفنية والتنظيمية والمؤسسية تلعب أدواراً مهمة في انتشار تبني EMA. على وجه التحديد ارتباط الميزة النسبية مع EMA، وضغوط المجتمع والضغوط التنظيمية، والضغوط المعيارية، ونوعية الشركات متعددة الجنسية، ووجود الدعم الداخلي ودعم الإدارة العليا بشكل إيجابي مع عملية انتشار تبني EMA. بالإضافة إلى ذلك، فقد تمَّ إجراء اختبار تحليل الانحدار اللوجستي للنظر في كيفية تحرك عملية انتشار EMA من مرحلة إلى أخرى بين الشركات الماليزية. في حين تشير نتائج الدراسة إلى أنَّ وجود الدعم الداخلي يؤثر على أخذ الشركات في الاعتبار EMA، وأيضاً تعتبر ضغوط أصحاب المصالح الداخلية ودعم الإدارة العليا من العوامل المساعدة في دفع الشركات إلى التحول من مرحلة الأخذ في الاعتبار إلى مرحلة التبني لنظام EMA. كما قامت الدراسة بتتبع التطور التاريخي لـ EMA منذ عام 1998 في ماليزيا. وبالرغم من أنَّ عملية تبني EMA في الشركات الماليزية يعتبر بطيئاً، إلا أنَّ عدد الشركات الماليزية التي تبنت EMA في ازدياد مستمر، مما يشير ضمناً إلى إمكانية توسع تبني EMA وتطبيقه بشكل أكبر بين الشركات الماليزية مستقبلاً. كما تشير النتائج إلى المشاكل المتعلقة بنقص المعرفة والخبرة بين المحاسبين من ضمن العوامل المؤثرة سلباً على عملية الانتشار والتبني EMA. إضافة إلى ذلك، فهناك إشارة إلى أنَّ التماثل المعياري قد يؤدي إلى عدم انتشار تبني EMA، وإضافة على ذلك فإنَّ عملية تقديم واقتراح تبني EMA يخضع لتحليل التكلفة والمنفعة، والذي بدوره يضع المحاسبين في موقف صعب عند تبرير تكاليف تبني EMA. وهذا يقود إلى ضرورة لعب الجمعيات المهنية ذات العلاقة والجامعات في دمج محاسبة الإدارة البيئية (EMA) في المناهج الدراسية والدورات التدريبية.

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This thesis is dedicated to my beloved parents

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LIST OF ABBREVIATION

CP	Cleaner Production
CSR	Corporate Social Responsibility
DOE	Department of Environment, Malaysia
DOI	Diffusion of Innovation
EMA	Environmental Management Accounting
EMAN	Environmental and Sustainability Management Accounting Network
EMS	Environmental Management Systems
EPI	Environmental Performance Indicator
IFAC	International Federation of Accountants
LCA	Life-cycle Analysis
LCC	Life-cycle Costing
MA	Management Accounting
MEMA	Monetary Environmental Management Accounting
METI	Ministry of Economy, Trade and Industry, Japan
MFCA	Material Flow Cost Accounting
NGO	Non-governmental Organisation
NIS	Neo-Institutional Sociology
PEMA	Physical Environmental Management Accounting
ROA	Return on Assets
ROCE	Return on Capital Employed
ROE	Return on Equity
ROI	Return on Investment
ROS	Return on Sales
UNSD	United Nations Division of Sustainable Development
USEPA	United States Environmental Protection Agency

CHAPTER ONE

INTRODUCTION

1.0 BACKGROUND

The rapidly changing business environment today has put firms under enormous pressure to change their way of conducting business and to be more innovative in order to remain competitive. With globalization and intense competition, firms need to be alert and respond to global issues, demands and standards to guarantee their survival. Environmental issues are among the subjects that demand corporate scrutiny nowadays as societies are beginning to be made aware of the adverse environmental impacts that could be caused by business activities (Jones, 2010). This mounting awareness has stimulated debate on the importance of corporate environmental performance, and companies are beginning to realize that it is important to place sustainable development on their business agenda and to act accordingly.

Accounting, particularly management accounting, has a valuable role in supporting environmental management (Collins, Lawrence, Roper & Haar, 2011; Contrafatto & Burns, 2013; Gray, 2010). Unfortunately, conventional management accounting is inadequate to cope with environmental concerns and business changes (Doorasamy & Garbharran, 2015; Johnson & Kaplan, 1987). Therefore, applying environmental accounting, particularly EMA, which is considered contemporary accounting and the solution to such a problem, is seen as an important approach that should be applied by business firms, especially by companies whose operations have greater impact on the environment (Dayana, 2010; Frost & Wilmshurst, 2000). EMA is a new approach, and so many companies are not aware of its benefits, and its weaknesses are quite unknown (Belal, Cooper & Roberts, 2013). Consequently,

research in this area is needed to provide in-depth understanding and evidence of the benefits that EMA might bring. However, EMA research is limited (Burritt, Schaltegger & Zvezdov, 2011), with the majority of studies being documented only through case studies and only with the application of some EMA tools (e.g Deegan, 2003a; Gale, 2006; Jasch, 2009; Staniskis & Staskiene, 2006). Furthermore, research is prescriptive and tends to describe the current state of implementation with a limited number of case studies analysing and critically evaluating its effectiveness (Bouma & van der Veen, 2002; Melchiorson, Mogensen & Rikhardson, 2005). Little is known about how EMA diffuses in organizations. Accordingly, the present study aims to address this. Specifically, the primary objective of this study is to examine the diffusion of EMA among environmentally sensitive companies in Malaysia. The research focuses on the factors that influence this phenomenon. Finally, the study examines the consequences of EMA adoption by such companies. Given that EMA may be conceived as an innovation (Osborn, Savage, Reyes & Muradyan, 2002), the theory used is that of Rogers' (2003) diffusion of innovation theory. More importantly, EMA is subjected to an innovation cycle of invention, diffusion, adoption and rejection patterns (Geroski, 2000). Accordingly, it is possible to significantly improve the understanding of the process of EMA implementation by applying the constructs and tools of diffusion research (Osborn et al., 2002).

The selection of Malaysia as a focus of this study is to represent industrializing countries, since Malaysia is one of the few developing nations that are enjoying rapid and high annual growth rate (Ernst & Young, 2014). Moreover, because Malaysia depends on such industry sectors as agriculture, manufacturing and heavy industries (with 47 percent of GDP), environmental issues in Malaysia have become a very serious concern and there appears to be growing public awareness of such issues

(Bakhtiar, Maliah & Nik Nazli, 2009; Haslinda, Lehman & Noraini, 2006; Ramasamy & Ting, 2004). Moreover, the concepts and functions of social and environmental accounting have been accepted by Malaysian accounting practitioners, who acknowledge the environmental management accounting approach as practical, relevant and crucial for today's environment (Zulkifli, Telford & Marriott, 2009). The use of EMA has the potential to help industries in Malaysia to address environmental issues, since the negative impact of operations on the environment is worsening and may affect the community's health and welfare (Anwar, Habib, Haslenda, Saeed & Ramli, 2014; DOE, 2012; Fauziah & Agamuthu, 2012). With the drive towards achieving the status of an industrialized nation by the year 2020, the quality of the Malaysian environment is expected to be further threatened. For this reason, environmentally responsible companies in Malaysia need to engage in environmental preservation initiatives while simultaneously maintaining economic growth; this calls for the practice of EMA. The present study is timely in providing a picture of the status of the adoption of EMA and an understanding of how it can further be promoted to help the country achieve a balance in its environmental and economic performance.

1.1 MOTIVATION FOR THE STUDY

Because empirical research on EMA is lacking, little is known about how EMA diffuses among organisations and whether companies are actually adopting it. Not much is known on how companies collect, manage and communicate their environmental information like carbon-related data (Burrirt et al., 2011). Moreover, there are very few EMA studies that are based on sound theory; of these, most have employed Contingency Theory and Institutional Theory (for example Chang & Deegan, 2008; Christ & Burrirt, 2013; Dayana, Maliah & Nik Nazli, 2011; Qian &

Burritt, 2008). According to Moore (2013), the role of management accounting for sustainable development is under-researched and there is a need for understanding the reasons behind the implementation of environmental management accounting systems.

In order to add to our comprehension of such matters, this study asserts that theory is necessary to ground our assumptions on particular topics. The literature does address a perspective of diffusion of innovation, but only few management accounting studies have subscribed to it; some have applied it but have focused only on Activity-Based Costing (ABC), balanced scorecard, target costing and transfer pricing (for example Askarany, Smith & Yazdifar, 2007; Ax & Bjornenak, 2005; Bjornenak, 1997; Jackson & Lapsley, 2003; Lapsley & Wright, 2004; Malmi, 1999). As any new accounting methods and standards can be conceived of as innovations, the phenomenon of accounting change is potentially explicable in terms of the theory of “diffusion of innovation” (Harrison & McKinnon, 1986; Rogers, 2003). It must be noted that there are various accounts to be found within the diffusion perspective which can explain why companies adopt a certain innovation while others do not (Rikhardsson, Bennett, Bouma & Schaltegger, 2005). Unfortunately, the research addressing such issues is still underdeveloped, particularly in the field of accounting (Naranjo-Gil, 2009).

In addition, there are still very few diffusion studies (both in the accounting field and other fields) that cover the issue of adoption rate (Rikhardsson et al., 2005; Rogers, 2003). Such paucity raises the question of how widespread an innovation actually is, how fast the particular innovation is spreading, and which companies are adopting it and which are not. Osborn et al. (2002) recognises the adoption rate extracted from primary data as important for measuring the progress of EMA.

Accordingly, by employing a survey research design, the present study is interested in examining the rate of EMA adoption and factors influencing the diffusion of the practice. By this, it is expected that the study will not only contribute to the knowledge of EMA but also add to the literature on innovation diffusion.

Most EMA studies have focused on developed countries such as the United States, Australia and Japan (for example Burritt & Saka, 2006; Chang & Deegan, 2008; Deegan, 2003a; Gale, 2006a; Wilmshurts & Frost, 2000). Less developed countries are relatively distinctive as they have a larger residue of traditional cultures and modes of production, and their poverty renders them more dependent on external finance, ideologies and structural reforms, with lower institutional capacity to deliver change (Hopper, Tsamenyi & Wickramasinghe, 2009). Therefore, the findings on the adoption of management accounting systems and factors influencing the adoption in more developed countries might not be relevant in the context of developing countries. This situation signifies a critical need for EMA studies to be conducted in developing nations, especially as environmental issues are always associated with industrialization and economic growth (Xiaomei, 2004). Realizing the importance of EMA and the difference in the characteristics of the countries, and considering the lack of research on accounting for the environment in developing countries (Belal et al., 2013; Burritt, 2004), this study contributes to the extant EMA literature from this perspective. As it is still an unexplored area of research concerning EMA adoption in environmentally sensitive companies in this setting, it is important to first understand the current state of accounting practices for managing environmental costs within these contexts.

1.2 RESEARCH OBJECTIVES

The primary objectives of this study are to examine the diffusion of EMA in environmentally sensitive industries in Malaysia, the motivations to adopt the practice and the consequences of adopting it. The secondary objectives are to describe the issues that initiate the need for EMA. Drawing from these, research objectives are listed as follows:

- 1) To describe the need for EMA and its diffusion among environmentally sensitive companies in Malaysia.
- 2) To identify the factors and the extent to which these influence the diffusion of EMA among environmentally sensitive industries in Malaysia.
- 3) To examine the effect of EMA adoption by environmentally sensitive companies in Malaysia towards the environmental and economic performance of the firm.
- 4) To understand the challenges and difficulties of EMA implementation.

1.3 RESEARCH QUESTIONS

To meet the research objectives, the following research questions are postulated:

- 1) What are the environmental issues faced by organizations in environmentally sensitive industries in Malaysia and the perceived impact of such issues on their operations?
- 2) What is the accountants' perception of the relevance of traditional accounting systems in identifying and managing environmental costs?
- 3) To what extent has EMA been adopted by companies in environmentally sensitive industries in Malaysia?

- 4) What possible factors influence the diffusion of EMA?
- 5) How does EMA affect the environmental performance of these companies?
- 6) How does EMA affect the economic performance of these companies?
- 7) What are the unintended adverse consequences and problems of EMA implementation?

1.4 CONTRIBUTION OF RESEARCH

This study is expected to contribute towards the body of knowledge in respect to environmental accounting. As noted by Parker (2011), there are still many unexplored aspects of social and environmental accounting research which demand further study to be done, and this includes the issue of why organisations do or do not undertake both social and environmental programs and reporting. Particularly in the EMA literature, publications on the topics are still dominated by conceptual studies, with only very little quantitative empirical work (mostly with case studies), and very few established management and accounting theories have been used (Christ & Burritt, 2014; Contrafatto, 2014; Contrafatto & Burns, 2013; Schaltegger, Gibassier & Zvezdov, 2011). The scenario seems to be more pronounced in the context of developing countries, including Malaysia (Burritt, 2004). Although environmental issues are gaining traction among academicians, the research focuses more on environmental disclosure (see for example, Azlan & Devi, 2008; Bakhtiar et al., 2009; Buniamin, 2012; Guidry & Patten, 2012; Nik Nazli & Haraf, 2013; Ramasamy & Ting, 2004; Smith, Khadijah & Ahmad, 2007; Thompson & Zakaria, 2004), while the study of EMA is still limited and conducted within a smaller scope (Christ & Burritt, 2014; Dayana et al., 2011; Lim, 2012). In order to comprehend the development of