

# Understanding environmental management accounting (EMA) adoption: a new institutional sociology perspective

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## Abstract

**Purpose** – *The purpose of this research paper is to report the results of a study that explains the relationship between institutional pressure and environmental management accounting (EMA) adoption. Specifically, it looks at the pressure of government and other parties in society concerning EMA adoption among manufacturing companies in Malaysia.*

**Design/methodology/approach** – *Drawing from the new institutional sociology theory, the paper seeks to identify the extent to which institutional pressure influences EMA adoption level. A total of 74 accountants from manufacturing companies in Malaysia participated in the survey. Institutional pressure (coercive isomorphism, normative pressure and mimetic processes) was tested against the level of EMA adoption via multiple regression analysis. Next, semi-structured interviews were employed with four survey participants to gain further insights into the survey results.*

**Findings** – *The findings of this study reveal some influence of institutional pressure on EMA adoption. Of these, normative pressure in terms of training and accounting body membership was found to be the most forceful.*

**Practical implications** – *Recognising the important role of accountants in managing environmental issues in organisations, this study highlights the influence of education and training as determinants of EMA adoption.*

**Originality/value** – *This paper offers a preliminary understanding from the new institutional sociology perspective concerning the type of pressure that influences manufacturing companies in Malaysia to adopt EMA.*

**Keywords** *Environmental management accounting, Institutional pressure, New institutional sociology, Coercive isomorphism, Normative pressure, Mimetic processes, Management accounting, Malaysia*

**Paper type** *Research paper*

## Introduction

Developments in the global business perspective, particularly concerning the environment (Newman and Hanna, 1996), indicate the importance for companies to integrate environmental aspects into their business management systems (Graff, 1997). In addition to complying with the current environmental legislation and regulations, many companies now incorporate environmental issues into their strategic planning and project evaluation, provide external environmental reports<sup>[1]</sup> and implement energy efficiency and waste minimisation programmes (CIMA, 1997). Such proactive efforts demand the dynamic application of environmental accounting.

Environmental accounting is a branch of accounting that specifically deals with environmental issues (Schaltegger and Burritt, 2000). Similar to accounting in general, environmental accounting can be divided into two parts – environmental management accounting (EMA) and environmental financial accounting (EFA). Through EMA, both monetary and physical environmental-related information are identified, collected, estimated, analysed and used for decision making within the organisation (Burritt *et al.* 2002). However, the focus of the present

study is limited to environmental costs and benefits information in monetary values. Thus, subsequent references to EMA in this study specifically relate to the monetary aspect of EMA.

Across the globe, studies on EMA have been conducted in different sectors using various perspectives (Bennett *et al.*, 2002; Bennett *et al.*, 2003; Jasch, 2006), with considerable attention being given to manufacturing industries (Kim, 2002; Kokubu and Kurasaka, 2002; Seuring, 2003; Gale, 2006; De Beer and Friend, 2006). In comparison with service industries, manufacturing industries generate obvious environmental impact resulting from the nature of their operations (Wee and Quazi, 2005; Chang, 2008). Recognising this, our 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 per cent share of gross domestic product (Central Bank of Malaysia, 2009). Approximately 18 per cent of the Malaysian labour force was employed by the manufacturing sector in 2008 (Institute of Strategic Analysis and Policy Research Malaysia, 2009). Additionally, the manufacturing sector is the country's leading export sector, contributing, on average, about 70 per cent of exports, with a third of the total export market being absorbed by the USA, Japan and EU countries (Malaysia External Trade Development Corporation, 2009). Given this, it is imperative that the manufacturing sector pays particular attention to environmental issues.

Most importantly, escalating concerns regarding the environment as well as progress in accounting itself provide signals for the substantial need for an accounting system that explicitly addresses environmental issues. In Malaysia, increased awareness amongst government and professional organisations is evidenced by the enthusiasm for the efficient management of environmental related information (ACCA, 2005; Economic Planning Unit Malaysia, 2006; Department of Environment Malaysia, 2008; Bursa Malaysia, 2009). Thus, recognising the paucity of EMA research on manufacturing organisations in Malaysia, the current study attempts to address this issue. More specifically, drawing from the new institutional sociology perspective, it considers the effect of institutional pressure on EMA adoption. Accordingly, the study aims to identify the type of institutional forces that will induce EMA adoption. It is believed that a better understanding of which institutional pressure is most forceful will allow for better identification of important factors that affect EMA adoption in the Malaysian manufacturing setting.

## Literature review

### *Environmental management accounting (EMA)*

Environmental management accounting (EMA) can be defined as the generation, analysis and use of environment-related financial information to support business decision-making (Bartolomeo *et al.*, 2000). Thus, EMA gives explicit economic consideration to a company's environmental related activities, specifically in dollars and cents (Schaltegger and Burritt, 2000). Through EMA, accountants are able to track and treat environmental costs and revenues, enabling a link between environment-related activities and the company's past, present and future financial stocks and flows (Burritt *et al.*, 2002). The various EMA tools allow efficient decision-making as they highlight environmental costs and allocate them appropriately (Deegan, 2003; Burritt, 2004). Prior literature has demonstrated the various economic and environmental benefits that come with EMA adoption. For instance, through EMA adoption, a more accurate environmental cost recording will subsequently allow better environmental and economic decision-making in the production process (Jasch, 2006). By using EMA tools, companies will be able to be more informative when evaluating their choices with regards to environmental investments and risks (Gale, 2006; Deegan, 2003). Despite the abovementioned benefits, uncertainty about the acceptance of EMA in Malaysia creates doubt as to whether it will eventually become an important component of management accounting practices. Thus, the present study, through the new institutional sociology perspective, espouses the idea that EMA is adopted not only for economic reasons but also due to legitimacy and political reasons, with a focus on institutional pressure.

### *Institutional pressure*

Until now, there has not been much discussion on the theoretical basis for the adoption of EMA (Bouma and Van der Veen, 2002). Nevertheless, factors such as national dependency, financial dependency, regulative environments, public exposure and political visibility have been linked to EMA practices (Bennett and James, 1998). In the USA, for instance, due to its tough environmental liabilities regime and regulatory penalties, it is claimed that the focus of EMA is more towards recognising and avoiding liabilities and penalties (Bennett and James, 1998). On the other hand, the focus of EMA in European countries is more towards resource and waste reduction opportunities. This is because resource costs are relatively high in European countries as compared to other parts of the world (Bennett and James, 1998).

Bouma and Van der Veen (2002) applied institutional theory on a case study exploring organisational changes, particularly relating to how environmental costs are captured in a company. Their study revealed that the company's concept of environmental costs is highly influenced by external parties such as the national statistics office, external accountant, banks, insurance companies and research institutes. These parties in particular were found to largely shape the mindset of the company's management in creating a concept for capturing the environmental costs. Bouma and Van der Veen's (2002) study concluded with a highlight on the important role of the organisational field in the development and adoption of EMA.

Past management accounting studies have shown that the role of government in public and private sector accounting practices, particularly through the legitimacy process, is a powerful one (Covaleski and Dirsmith, 1988; Arnaboldi and Lapsley, 2003). For instance, the study by Covaleski and Dirsmith (1988) examined budgetary practices in a public university and found that the budget preparation process heavily involves the articulation of governmental expectations and interests. In the late 1990s, as part of the UK central government's modernisation policies, Scottish local authorities were encouraged to include activity-based costing (ABC) as part of their accounting systems. Arnaboldi and Lapsley (2003) found evidence of isomorphism in the diffusion of ABC among these authorities. Accordingly, for these ABC adopters, adopting ABC is centred on being established by the society as "modern" in terms of costing practices (Arnaboldi and Lapsley, 2003).

Past studies have often established management accounting as an organisational device shaped by the organisation's important stakeholders (Brignall and Modell, 2000; Lapsley and Pallot, 2000; Hussain and Hoque, 2002; Hussain and Gunasekaran, 2002; Sila, 2007; Martinez-Costa *et al.*, 2008). Brignall and Modell (2000) identified funding bodies, professional service providers and purchasers of public services as the three main stakeholders influencing the implementation of multidimensional performance measurement in a public sector organisation.

Lapsley and Pallot (2000) explored the relationships between management styles, influence of accounting and financial information, and institutional setting in two local governments in Scotland and two local governments in New Zealand. They noted diverse responses to new public management mirrored by the divergence of management accounting practices between these two countries. In New Zealand, management accounting is observed as the key instrument in reform, while the role of management accounting is found to be limited in Scotland. In Scotland, management accounting practices relate to the portrayal of organisations as rational and modern, with evidence of institutional isomorphism. The findings of Lapsley and Pallot (2000) confirmed that management shapes and influences its organisational practices with a view to gaining external legitimacy (Meyer and Rowan, 1977).

In their investigation of factors relating to the adoption of non-financial performance measurement in four Japanese banks, Hussain and Hoque (2002) found that apart from economic and technical reasons, the design and use of performance measurement systems in the banks is influenced by normative and coercive pressure from top management and professionals in the organisation. Additionally, the interviews also revealed coercive pressures arising from the central bank's regulatory control, accounting standards and financial legislation, and socioeconomic-political institutions as factors affecting the non-financial performance measurement adoption. However, no evidence relating to the

copying of performance measurement systems design[2] was found in any of the four case studies, hence ruling out the influence of mimetic processes on NFP measures for all four Japanese banks (Hussain and Hoque, 2002).

A similar study by Hussain and Gunasekaran (2002) investigated the practice of non-financial performance measurement in Finnish banks and financial institutions. Hussain and Gunasekaran (2002) linked coercive pressure, normative influences, and mimetic factors to non-financial performance measurement in Finnish banks and financial institutions. Among the three mechanisms, coercive pressure from the Central Bank and socioeconomic and political institutions was found to be the most influential, followed by normative influences and mimetic factors. Normative influences include management's competence and strategic orientation, while mimetic factors concern pressure to integrate management accounting systems with strategic priorities and copying best practice of performance measurement systems from similar organisations (Hussain and Gunasekaran, 2002).

Likewise, Sila (2007) and Martinez-Costa *et al.* (2008) advocated the idea that institutional pressure influences management accounting practices. Sila (2007) investigated the role of institutional pressure on total quality management (TQM) practices of manufacturing and services companies in the USA. Their findings revealed a similarity in TQM practices among US-owned and foreign-owned companies operating in the USA. Consequently, this highlights the more dominant role of global, industrial and economic pressure as compared to cultural factors in influencing the structures, processes and practices of companies operating in the USA. Sila (2007) suggested that both US and foreign companies operating in the USA mimic each other's TQM practices in order to appear legitimate in the eyes of their stakeholders (Sila, 2007).

A recent study on TQM and ISO 9000 certification by Martinez-Costa *et al.* (2008) categorised the motivation for ISO 9000 into two types:

1. internal motivation; and
2. external motivation.

Assuming that ISO 9000 certification is a result of institutionalisation and, hence, being implemented all over the world, Martinez-Costa *et al.* (2008) found that internal reasons for ISO 9000 certification, such as achieving better productivity and efficiency, result in better performance and TQM implementation compared to external motivations for ISO 9000 certification, such as from customers and market demand. Martinez-Costa *et al.* (2008) also compared the role of internal and external pressures on competitive advantage. They reasoned that internally generated pressures will eventually become part of the resource and capabilities that stimulate improved performance. On the other hand, efforts to satisfy requirements from external pressure are normally confined to conformance at the administrative or surface level (Meyer and Rowan, 1977).

Additionally, it is also interesting to take note of normative pressure from those involved in management accounting practices. Accountancy is a field that is well known for its procedural practice, where the norm is to adopt standard actions or responses when dealing with issues and challenges (Siegel *et al.*, 1997; Fogarty and Rogers, 2005). According to Siegel *et al.* (1997), normative mechanisms, such as filtration during the hiring process of accountants, as well as socialisation with peers and accounting academics, have resulted in similar professional attitudes, perceptions and aspirations among accountants. Furthermore, common demands in terms of basic skills and experience, as well as similar promotion practices among employers, are among factors that contribute to isomorphism in the work of accountants (Siegel *et al.*, 1997). Another example of the existence of normative pressures is through occupational socialisation (Bennett *et al.*, 2004). For example, Fogarty and Rogers (2005) highlighted the dominant role of institutions in the work of financial analysts. They found that despite the sufficiency of accounting data to support arguments or the underlying conclusions, financial analysts are still profoundly dependent upon information from corporate managers when performing their analysis. In summary, the present study proposes that institutional theory is well suited to explain the influence of

institutional factors on EMA adoption. The next section provides a discussion of the theoretical framework and hypothesis development.

### Theoretical framework

The institutional theory perspective is mainly built upon theoretical insights from sociology and economics (DiMaggio and Powell, 1983; Siegel *et al.*, 1997; Lapsley and Pallot, 2000; Bouma and Van der Veen, 2002). The theory is beneficial in addressing the role of institutions on the behaviour of companies and their employees. More specifically, institutional theory explores how organisational structure and actions are shaped by institutional forces such as the government, profession and society that surround organisations. In general, institutional theory can be divided into three strands:

1. old institutional economics;
2. new institutional economics; and
3. new institutional sociology.

The new institutional sociology perspective offers some insights into understanding the practice of accounting based on a broad variety of areas including cognitive science, cultural studies, psychology and anthropology, while at the same time discarding the rational-actor perspective (Moll *et al.*, 2006). The new institutional sociology perspective takes the view that the adoption of a particular accounting system is largely driven by the need of the organisation to conform to external pressures as opposed to the desire for increased internal efficiency (Covalesski and Dirmsmith, 1988; Moll *et al.*, 2006). Such a perspective (the new institutional sociology perspective) is relevant for the current study as it captures the issues of external (macro) and internal (micro) organisational contexts that organisations are within (Meyer and Rowan, 1977; Lapsley and Pallot, 2000; Hussain and Hoque, 2002), and to which EMA adoption level may be related.

Organisations are bound to be institutionalised by the institutions around them (Meyer and Rowan, 1977; DiMaggio and Powell, 1983; Zucker, 1987). These institutions could be in the form of internal parties, for example, the organisation itself, as well as external sources such as the state and other organisations (Zucker, 1987). Pressure is usually applied formally by the institutions through written laws, regulations and standards, as well as informally through the invention of norms, habits and customs. In their effort to ensure that the organisation can win or survive, organisations' participants will normally respond to these pressures by acting in accordance with the rules that have been set out by the institutions (Meyer and Rowan, 1977; DiMaggio and Powell, 1983; Tolbert and Zucker, 1983; Zucker, 1987).

Institutionalisation in organisations can be defined as "the process through which components of formal structure become widely accepted, as both appropriate and necessary, and serve to legitimate organizations" (Tolbert and Zucker, 1983, p. 25). Accordingly, the legitimacy-seeking behaviour of organisations will lead to the development and adoption of practices to fulfil the expectations of the various constituents in their environment (Moll *et al.*, 2006). In other words, when an organisational element is widely understood as appropriate and necessary, it becomes institutionalised. Thus, in order to appear proper and adequate, organisations will incorporate this institutionalised element even when there is an absence or a conflict of efficiency that comes with its existence (Meyer and Rowan, 1977; Tolbert and Zucker, 1983).

An important element within the new institutional sociology perspective is the isomorphic concept. As organisations are structured by phenomena in their environments and gradually become homogenised with them (Meyer and Rowan, 1977; DiMaggio and Powell, 1983), organisations will then be able to demonstrate that they are not only legitimate but stable by social definition. Hence, this will encourage greater commitment from internal participants and external constituents. This point reflects the significance of the isomorphic process in promoting an organisation's success and survival (Meyer and Rowan, 1977). Generally, there are three mechanisms through which institutional isomorphic change can occur:

1. coercive isomorphism;
2. mimetic processes; and
3. normative pressures (DiMaggio and Powell, 1983).

Coercive isomorphism occurs in response to political influence or/and legitimacy problems. Here, organisations are bound to change their formal rules and procedures due to formal and informal pressures from the environment. Among the sources of coercive isomorphism are governmental legislation, as well as other organisations upon which the company is dependent (DiMaggio and Powell, 1983). On the other hand, mimetic processes are a result of standard responses to uncertainty. Through mimetic processes, an organisation seeks legitimacy by resembling the response of other similar or superior organisations in terms of initiatives (DiMaggio and Powell, 1983). The third mechanism, i.e. normative pressures, stems from professionalism. There are two main sources of professionalism:

1. education; and
2. professional networking.

It is also vital to note that all three mechanisms mentioned above tend to overlap. Thus, they are not always empirically distinct from each other (DiMaggio and Powell, 1983).

### *Development of hypotheses*

The new institutional sociology perspective of institutional theory has established that management accounting may be adopted in a certain way to comply with the pressure from the government as well as various parties in society. Accordingly, prior studies on organisations have linked the adoption of contemporary management accounting practices such as activity-based costing (ABC) (Arnaboldi and Lapsley, 2003), non-financial performance measurement (Hussain and Gunasekaran, 2002; Hussain and Hoque, 2002), total quality management (TQM; Sila, 2007; Martinez-Costa *et al.*, 2008) and ISO 9000 certification (Martinez-Costa *et al.*, 2008) to institutional pressure.

In summary, it may be proposed that all three mechanisms of institutional pressure – i.e. coercive isomorphism, normative pressure and mimetic processes – will influence the extent to which organisations adopt EMA. Prior studies have placed considerable emphasis concerning political influence and legitimacy issues on management accounting practices. Additionally, the role played by accountants in management accounting practices is likely to provide companies with normative pressure that will eventually affect their management accounting practices. Next, companies in their struggle to appear legitimate in their operating environments tend to try to reduce the level of uncertainty faced by copying certain management accounting practices of other companies, hence being involved in mimetic processes. All three points highlighted above will subsequently lead to some influence of coercive isomorphism, normative pressure and mimetic processes on EMA adoption level. On the basis of the above discussion, the following hypotheses are developed:

- H1.* There is a positive relationship between EMA adoption level and coercive isomorphism.
- H2.* There is a positive relationship between EMA adoption level and normative pressure.
- H3.* There is a positive relationship between EMA adoption level and mimetic processes.

### **Research method**

Data were collected using both quantitative and qualitative methods (Creswell, 2003). During the first phase, a mail questionnaire survey of accountants was carried out in order to test the research hypotheses. The accountants, representing the companies surveyed, were selected due to their responsibilities concerning financial measures. After the quantitative data was analysed, the study then proceeded to the second phase, i.e. personal interviews. Semi-structured interviews were conducted to obtain better insights (Morgan, 2006) into the relations observed from the quantitative data analysis. In particular, the interviews were



employed to provide some explanation from the group of respondents who provided the questionnaire survey data, thus acting as interpretive sources for the results of the quantitative methods (Morgan, 2006). Four companies participated in the post-survey interviews.

### *The sample*

A total of 1,069 survey questionnaires were mailed to accountants of manufacturing companies selected from the 2006 Federation of Malaysian Manufacturers *Directory* (Federation of Malaysian Manufacturers, 2006) using the generated random sampling method. Enclosed with each questionnaire was a cover letter explaining the importance of the study and assuring the confidentiality of the answers. Additionally, a support letter from the Department of Environment Malaysia was also enclosed to elicit a higher response rate. However, no follow-ups were undertaken because the study strictly preserved anonymity. Only 86 accountants returned the questionnaires, with 74 of them providing usable information. Despite the increasing interest in environmental sustainability issues worldwide, the low response rate of 8 per cent was expected. Similarly, prior mail surveys on emerging accounting issues in Malaysia have also revealed a pattern of low but acceptable response rates (Foong, 2002; Che Ruhana, 2007).

As the person in charge of the financial measures of company activities, including those that are environment-related, the views of the accountants are essential in getting clear evidence regarding EMA adoption (Burritt *et al.*, 2002). Table I summarises selected characteristics of the respondents. About 53 per cent of the accountants had been employed with their present employers for more than five years and about 39 per cent of the accountants had been employed with their present employers for between one and five years. Next, 36 per cent of the accountants had been in their current position for more than five years and 54 percent had been in their current position for between one and five years. This suggests that the respondents are sufficiently knowledgeable regarding the companies' practices.

**Table I** Profile of respondents

<i>Description</i>	<i>Frequency</i>	<i>Percentage</i>
<i>Age (years)</i>		
20-35	30	40.5
36-50	32	43.2
51-65	11	14.9
Over 65	1	1.4
Missing	0	0
Total	74	100
<i>Highest education</i>		
High school/certificate	7	9.5
Diploma	12	16.2
Bachelor's degree	23	31.1
Master's degree/PhD/professional	31	41.9
Missing	1	1.4
Total	74	100
<i>Number of years in the company</i>		
< 1	6	8.1
1-5	29	39.2
6-10	17	23
11-20	13	17.6
> 20	9	12.2
Total	74	100
<i>Number of years in current position</i>		
< 1	7	9.5
1-5	40	54.1
6-10	13	17.6
11-20	8	10.8
> 20	6	8.1
Total	74	100

In the present study, the unit of analysis is the organisation. The manufacturing companies that participated in the survey comprised various industries including chemical, wood, plastic, rubber, metal, electrical, electronics, automotive, machinery, building materials, food, tobacco and others. As shown in Table II, the majority of these companies market their products solely to the Malaysian market and are owned by Malaysian residents. Only about a third of these companies have environmental management systems certification.

### *Measurement of variables*

The EMA adoption level refers to the part of management accounting that observes the economic impact of the company's environmental related activities. It specifically focuses on the tracking, tracing and treatment of costs, earnings and savings incurred in relation to the company's environmental related activities (Burritt *et al.*, 2002). A checklist was used in the questionnaire to gather data on EMA adoption by measuring on a scale of 1 (none at all) to 5 (very much) the undertaking of the following tools:

- environmental cost accounting;
- environmentally induced capital expenditure and revenue;
- post assessment of relevant environmental costing decisions;
- environmental life cycle costing;
- environmental target costing;
- post investment of individual environmental projects;
- monetary environmental operational budgeting;
- monetary environmental capital budgeting;
- environmental long-term financial planning;
- relevant environmental costing;
- monetary environmental project investment appraisal;
- environmental life cycle budgeting; and
- environmental life cycle target pricing.

**Table II** Profile of sample companies

<i>Description</i>	<i>Frequency</i>	<i>Percentage</i>
<i>Sector of operation</i>		
Chemical and wood	14	18.9
Plastic, rubber and metal	16	21.6
Electrical and electronics	6	8.1
Automotive and machinery	5	6.8
Building materials	4	5.4
Food and tobacco	8	10.8
Others	15	20.3
No information	6	8.1
Total	74	100
<i>Products' main market</i>		
Malaysia	36	48.6
Foreign	24	32.4
Both	14	18.9
Total	74	100
<i>EMS certification</i>		
Yes	25	33.8
No	44	59.5
Planning to have	5	6.8
Missing	0	0
Total	74	100



These information tools were based on the items listed in Burritt *et al.*'s (2002) EMA comprehensive framework.

Institutional pressure is the pressure faced by organisations to improve environmental performance from the government, profession and society (DiMaggio and Powell, 1983; Nakamura *et al.*, 2001). Generally, this pressure can be classified into three types of mechanisms, i.e. coercive isomorphism, normative pressure and mimetic processes (DiMaggio and Powell, 1983). The process of deriving the items to measure institutional pressure includes an extensive literature review and discussions with experts in relevant areas (accounting and engineering academicians, accountants and environmental managers). Prior studies have identified various sources of institutional pressure including from the government, funding bodies, professional service providers, customers, financial institutions, research institutes, management, accountants and the market (Lapsley and Pallot, 2000; Hussain and Hoque, 2002; Hussain and Gunasekaran, 2002; Arnaboldi and Lapsley, 2003; Bouma and Van der Veen, 2002; Sila, 2007; Martinez-Costa *et al.*, 2008). In the study, the extent of institutional pressure is measured on a scale of 1 (strongly disagree) to 5 (strongly agree). The items used to measure institutional pressure are shown in the Appendix.

### Data analysis

A comparison of early (ten earliest responses) and late (ten latest responses) respondents was undertaken. The results of the independent samples *t*-test indicated no significant differences in the equal variance estimates between the early and late respondents ( $p > 0.05$ ) for all the variables. Thus, there is no evidence of non-response bias. Next, the present study assesses the validity of the constructs by using factor analysis through principal component analysis (PCA). In order to ensure reliability, Cronbach's  $\alpha$  tests were then conducted on the items extracted from the PCA. Tables III–V summarise the results of the PCA and Cronbach's  $\alpha$  test for variable EMA, coercive isomorphism, normative pressure and mimetic processes. Only one component was identified as the construct measuring EMA, while three components were identified as constructs that measure institutional pressure, i.e. coercive isomorphism, normative pressure and mimetic processes[3]. The Cronbach's  $\alpha$  reliability estimates indicate acceptable scores for all variables. Some assessments[4] were also carried out to ensure that the data did not violate multiple regressions assumptions.

Multiple regression analysis was used to test the hypothesis. Consistent with the PCA analyses, the model used is as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3,$$

**Table III** PCA and Cronbach's  $\alpha$  test on EMA

Items and description	EMA
Relevant environmental costing	0.950
Environmental life cycle budgeting	0.940
Monetary environmental project investment appraisal	0.925
Environmental long term financial planning	0.914
Environmental lifecycle costing	0.907
Environmental lifecycle target pricing	0.901
Environmental target costing	0.901
Monetary environmental capital budgeting	0.898
Monetary environmental operational budgeting	0.896
Post assessment of relevant environmental costing decisions	0.892
Post investment assessment of individual projects	0.858
Environmentally induced capital expenditure and revenue	0.800
Environmental cost accounting	0.763
Percentage of variance explained	79.138
KMO-MSA	0.935
Bartlett's test of sphericity	0.000
Cronbach's $\alpha$	0.978

**Table IV** PCA and Cronbach's  $\alpha$  test on institutional pressure – coercive isomorphism and normative pressure

<i>Items and description</i>	<i>Coercive isomorphism</i>	<i>Normative pressure</i>
Governmental regulation	0.860	
Fines	0.828	
Shareholders	0.591	
Local communities	0.561	
Environmental groups	0.513	
Membership in accounting body		0.911
Training		0.868
Percentage of variance explained	66.220	
KMO-MSA	0.743	
Bartlett's test of sphericity	0.000	
Cronbach's $\alpha$	0.798	0.859

**Table V** PCA and Cronbach's  $\alpha$  test on institutional pressure – mimetic processes

<i>Items and description</i>	<i>Mimetic processes</i>
Leaders in the industry	0.923
Other industrial organisations	0.907
Multinationals	0.907
Competitors	0.907
Percentage of variance explained	83.029
KMO-MSA	0.859
Bartlett's test of sphericity	0.000
Cronbach's $\alpha$	0.932

where  $X_1$  is coercive isomorphism,  $X_2$  is normative pressure,  $X_3$  represents mimetic processes, and  $Y$  is EMA adoption.

#### *Descriptive statistics of variables*

The mean score for EMA (Table VI) shows a low EMA adoption level. It seems that accountants do not participate much in the environmental management systems of the companies. During the post-survey interviews, it was found that the accountants are generally satisfied with the current EMA adoption as well as the absence of any benchmarking being made with the competitors regarding it. The mean score for coercive isomorphism (i.e. 3.168) suggests that respondents believe they face a moderate level of institutional pressure (concerning environmental related issues) through legitimacy or political influence. Similarly, they believe that they face a moderate level of institutional pressure (concerning environmental related issues) when uncertainty arises (mean score for mimetic processes of 3.206). However, the respondents also feel that they face a relatively low (normative pressure mean score of 2.115) institutional pressure via professionalism (concerning environment-related issues).

Table VII reports the correlation matrix of the variable EMA, mimetic processes, coercive isomorphism and normative pressure. The correlation matrices between the independent

**Table VI** Descriptive statistics

<i>Variables</i>	<i>Mean</i>	<i>Median</i>	<i>SD</i>
EMA	2.330	2.308	1.014
<i>Institutional pressure</i>			
Coercive isomorphism	3.168	3.200	0.882
Normative pressure	2.115	2.000	1.039
Mimetic processes	3.206	3.000	0.862

**Table VII** Pearson correlations

	EMA	Coercive isomorphism	Normative pressure	Mimetic processes
EMA	1			
Coercive isomorphism	0.342*	1		
Normative pressure	0.528*	0.509*	1	
Mimetic processes	0.415*	0.665*	0.516*	1

**Note:** \*Correlation is significant at the 0.01 level (two-tailed)

variables also confirm that there is no violation of multicollinearity, since there is no correlation above 0.7 among the independent variables. More importantly, the Pearson's correlation coefficients demonstrate significant associations between EMA and coercive isomorphism, EMA and normative pressure and EMA and mimetic processes in the expected direction.

While the correlation analyses are informative, the regression analysis provides a more detailed description about the relationships between the dependent and independent variables. The results of the regression equation in Table VIII indicate that the regression model is significant ( $p < 0.01$ ,  $F = 10.334$ ) and has an adjusted  $R^2$  of 27.7 per cent. The results particularly indicate that EMA adoption is significantly associated with normative pressure ( $p < 0.01$ ), but not with coercive isomorphism and mimetic processes. Thus, for each unit increase of normative pressure to improve environmental performance, EMA adoption increases by 0.430. These results allow support for *H2*. On the other hand, there was no evidence to support *H1* and *H3*.

The post-survey interviews found that none of the four interviewees encountered any normative pressure concerning environmental related matters in their accounting practices. However, they do agree that normative pressure (educational background, job training and networking) plays a vital role in the job of accountants, including the adoption of EMA. All four interviewees indicated that the education and training that they received, as well as their membership of the accounting association, were strong factors that influence the way they work in every sense. For example, A1[5] pointed out that: "In terms of technical knowledge and the way of doing things, of course the influence (of education and training) is very strong". Interviewee A2 touched on the importance of professional ethics: "I'm a member of ACMA [Associate Chartered Management Accountant]. As accountants we practice following our professional ethics [...] be independent and apply according to rules and regulations". In contrast with the survey findings, the post interviews reveal some evidence of coercive isomorphism in terms of environmental performance. All four of the interviewees agreed that their organisations are currently pressured by various parties (for example shareholders, government, head office and customers) in terms of environmental performance. Three of the four interviewees identified customers from the European market as the most demanding party in terms of requirements on environmentally friendly products and processes. According to accountant A1: "Our product can only enter European Union [EU] port if they are lead free". Likewise, A2 stated that: "We not only use equipment to test and make sure that our products are complying to RoSPA[6] requirements [...] we even have fishes in the tank to ensure that our waste water is safe for living species". On the other hand, one interviewee (whose market is limited to Asian countries) named the

**Table VIII** Results of regression

Hypothesis	Independent variable	Coefficient	Standard value	Standard error	t	Probability
H1	Coercive isomorphism	$\beta_1$	-0.010	0.159	-0.070	NS
H2	Normative pressure	$\beta_2$	0.430	0.117	3.575	< 0.01
H3	Mimetic processes	$\beta_3$	0.200	0.163	1.442	NS

**Notes:** Equation:  $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$ . Adjusted  $R^2 = 0.277$ ,  $F = 10.334$ , probability < 0.01

company's shareholder as the most influential party concerning environmental performance. The shareholder, a Japanese holding company, has its own company policy regarding environmental-related matters. All its subsidiaries are expected to follow the standard policy, which covers various aspects including management accounting. Next, when asked about mimetic processes, three out of the four interviewees concur with an almost non-existence of uncertainty in terms of accounting practices related to environmental issues. This is due to the availability of company policy as well as advice from consultants hired to provide guidance on environmental-related issues. Thus, there is no need for companies to mimic each other when dealing with uncertainties on environmental issues. However, one interviewee mentioned the uncertainty problem it once had with European regulators that resulted in the company being penalised with a fine. In summary, the findings of the interviews contradict the survey results on the relationship between EMA adoption and normative pressure, as well as the relationship between EMA adoption and coercive isomorphism. Additionally, some insights into the irrelevancy of mimetic pressure in influencing EMA adoption were also provided.

## Discussion and conclusion

The findings of this study highlight some interesting insights concerning EMA adoption among manufacturing companies in Malaysia. Although the questionnaire survey found no significant relation between coercive isomorphism and EMA adoption, the post-survey interviews revealed the opposite. Consistent with the findings of prior management accounting studies (Covalesski and Dirmsmith, 1988; Hussain and Gunasekaran, 2002; Hussain and Hoque, 2002; Arnaboldi and Lapsley, 2003; Sila, 2007; Martinez-Costa *et al.*, 2008), the accountants interviewed agreed that they were pressured by their customers, shareholders, head office and the government in terms of environmental performance. This pressure will then influence company policy and, subsequently, affect their management accounting practices, including EMA adoption.

In general, normative pressure was found to significantly affect the EMA adoption level. The questionnaire survey found a significant relation between normative pressure and EMA adoption level, while the post-survey interviews revealed the opposite. None of the four accountants interviewed felt that they faced any normative pressure concerning environmental matters in their accounting practices. However, they did agree that their work was highly structured, dictated by their educational background and the training that they receive (Siegel *et al.*, 1997). As accountants, they are naturally responsive towards information provided from networking, especially with other fellow accountants and the association that they are registered with (Bennett *et al.*, 2004; Fogarty and Rogers, 2005). Interestingly, the above-mentioned findings suggest the potential role of normative pressure as a strong antecedent for EMA adoption.

Consistent findings were obtained from the questionnaire survey and post-survey interviews on the insignificant relation between mimetic processes and EMA adoption level. It is generally believed that company policy, as well as the consultant's advice, are among the most common guides used by accountants when dealing with uncertainty related to environmental issues. The availability of these reliable references and advice may reduce the uncertainty that arises in relation to management accounting and environmental management practices. This will subsequently lessen the need for copying management accounting practices (Hussain and Gunasekaran, 2002; Hussain and Hoque, 2002), including EMA, from other organisations.

Theoretical insights offered by new institutional sociology (DiMaggio and Powell, 1983) argue that institutional forces comprising the government, the profession and the society within which an organisation exists, shape the organisation's structure and determines its actions. The results from the present study appear to suggest that such forces may have likely been the factors influencing EMA adoption among the sample manufacturing companies. Overall, this study provides some empirical support on the influence of normative pressures and coercive isomorphism on EMA adoption level. In other words, policy makers (e.g. Department of Environment, Inland Revenue Board, accounting

associations and institutions of higher learning) are found to have a significant role in inspiring manufacturing companies to increase their adoption of EMA. From the perspective of the new institutional sociology, it can be argued that education plays a vital role influencing accountants with regard to EMA adoption. This is because the accountants' training and education will influence them through the existence of normative pressures. Consequently, future and current accountants should be appropriately trained so that they are competent in managing an accounting system that gives attention to environmental sustainability.

The present study contributes to the management accounting literature, examining emerging issues related to the environment such as the adoption of EMA. Recognising the fact that sociological orientation may affect the systems of the organisation, the current study reveals some support for the new institutional sociology perspective of institutional theory, where coercive isomorphism and normative pressure were found to influence positively the adoption level of EMA. More importantly, this study highlights the important role of policy makers and educational bodies – specifically accounting associations, the DOE, the Inland Revenue Board and institutions of higher learning – in inducing EMA adoption among manufacturing companies in Malaysia. Manufacturing companies, and particularly the accountants within them, need to be exposed to the benefits of having an efficient environmental cost management that fully internalises and tracks their environmental costs in detail.

The introduction of the Malaysian Code on Corporate Governance as well as the release of the Environmental Reporting Guidelines, followed by Sustainability Reporting Guidelines are indeed among the much needed steps to drive Malaysian companies towards better environmental disclosure. Nevertheless, increased legislation on environmental reporting may only lead to compliance in form but not substance, as the environmental efforts demonstrated are often separated from the business functions (Lopez, 2009). What is more important here is for policy makers in Malaysia to enlighten companies on the opportunities that come with good environmental management. For a start, the Malaysian Accounting Standard Boards and Malaysian Institute of Accountants should work in concert to publish an EMA guideline that specifically assists Malaysian companies that are interested in better environmental management. It is felt that a guideline that stresses the internal management function of environmental accounting will be a good start to support environmental accounting practices that focus on eco-efficiency. At the same time, the Malaysian Institute of Accountants and other professional accounting bodies in Malaysia (for example, the Association for Chartered Certified Accountants and the Chartered Institute of Management Accountants) may play a more aggressive role in promoting EMA among its members. For instance, the Malaysian Sustainability Reporting Awards (MASRA) and the National Annual Corporate Reporting Awards (NACRA) may highlight to participants the need for environmental reporting that imparts information on the impact of environmental related initiatives to business and stakeholders in numerical values. More importantly, the National Award for Management Accounting (NAFMA)[7], a prestigious award that recognises best practices of management accounting in Malaysia, may perhaps include management accounting practices on environmental issues as part of the matrix in its assessment criteria (National Award for Management Accounting, 2009).

The present study has important international implications. At the moment, there is a lack of knowledge on the current state of EMA adoption among developing countries. Since much prior research on EMA has focused on developed countries such as those in Europe, the UK, the USA and Australia, the findings of the present study provide valuable insights into factors affecting the adoption of EMA from a developing country perspective. Similar research in other developing countries will provide more understanding on the consistency and differences amongst countries with regards to EMA adoption. Subsequently, this will provide a better understanding of how culture and the economy affect the importance and evolution of management accounting practices such as EMA (Joshi, 2001; Chanegrih, 2008; Abdel-Maksoud *et al.*, 2010). Additionally, the findings of the present study would also be of interest to multinational corporations (MNCs). More specifically, given the low level of EMA implementation in developing countries in general, and in Malaysia in particular, institutional pressure from MNCs would provide the impetus for enhanced EMA adoption.

In many ways, the findings of the current study must be interpreted with care. Due to the unavailability of existing suitable measurements for the key variables, all the measurements used in the study were self-developed and have not been used in the prior literature. Nevertheless, extra care was taken to ensure validity and reliability. Another limitation of this study concerns its cross-sectional nature, resulting in time-specific findings. The findings of the present study must also be treated cautiously as they are the result of self-rating scales, and thus may inherit a higher leniency error. Furthermore, the results are generally descriptive in nature and may not identify the full extent of EMA adoption and its relationship with institutional pressures. Alternatively, approaches such as case study and experimental designs may be more appropriate.

Based on the above findings and limitations, future research on the link between EMA adoption and institutional pressure may also consider the involvement of other parties in the organisation, for example top management, divisional management, the human resources department, the corporate marketing and public relations department, the purchasing department, the marketing and sales department, and the disposal and recycling department. Besides accountants, the above-mentioned parties are among the business actors who are likely to be involved with EMA adoption (Burritt *et al.*, 2002). It is felt that similar research with a more holistic approach will provide a clearer picture concerning EMA adoption. Another important direction for future research is to explore similar issues within other sample types such as education, hospitality and municipal councils. Such replication will strengthen the theoretical foundations proposed in the current study.

## Notes

1. In some countries, it is now mandatory to include information related to environmental performance in the company's financial reports (International Federation of Accountants, 2005).
2. The copying of PMS design for certain uses that are not consistent with the needs and objectives of the organisation (DiMaggio and Powell, 1983).
3. For variable institutional pressure, two PCAs were run separately in order to meet the sample size requirement of five cases per item scale (Hair *et al.*, 2006). The first PCA runs items that measure coercive isomorphism and normative pressure, while the second PCA runs items that measure mimetic processes.
4. Analyses to test normality and linearity were conducted. The results obtained showed justifiable consideration for multiple regression analysis.
5. The four accountants who participated in the interviews are labelled A1, A2, A3 and A4.
6. The Royal Society for the Prevention of Accidents.
7. NAFMA is jointly organised by MIA and CIMA. The areas of assessment for NAFMA include management accounting information, value creation and business results.

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## Appendix: Institutional pressure items

### *Coercive isomorphism*

- Our environmental practices are influenced by the company's labour union.
- Our environmental practices are influenced by the company's customers.
- Our environmental practices are influenced by the company's shareholders.
- Our environmental practices are influenced by the company's head office.
- Our environmental practices are influenced by the local communities.
- Our environmental practices are influenced by the environmental groups.
- Our environmental practices are influenced by the financial institutions.
- Government has set some pollution/production standards so we have to make sure that we do not violate them.
- Newspapers and TV have created a lot of concern about environmental issues, and this has put pressure on our company to improve our environmental performance.
- A pollution incident, if reported by the media, could ruin our corporate image and market, so we must pay full attention to such issues before they become a public concern.
- My company is subject to a lot of governmental regulation regarding environmental matters.
- My company is subject to pay fines if there is a failure to comply with environmental laws.

### *Normative pressure*

- My company often sends its accounting staff for training with regards to environmental practices.
- My company's environmental practices have been influenced by membership of an accounting body (e.g. ACCA, CIMA, etc).

### *Mimetic processes*

- In situation of uncertainty, my company's environmental practices have been influenced by what other industrial organisations have done.
- In situation of uncertainty my company's environmental practices have been influenced by what our competitors have done.
- In situation of uncertainty my company's environmental practices have been influenced by what leaders in the industry have done.
- In situation of uncertainty my company's environmental practices have been influenced by what the multinationals have done.

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