Environmental Strategy, Environmental Management Accounting and Organizational Performance: Evidence from The United Arab Emirates Market

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Abstract

The purpose of this paper is to examine the association between the Environmental Strategy (ES) and Environmental Management Accounting (EMA) usage. It also aims to consider the effect of EMA usage on the organizational performance. A research framework was developed based on the contingency theory. Data were collected via questionnaires distributed to companies listed on UAE Stock Markets (ADX and DFM) in 2016. Data were analyzed using a structural equation modelling. The model was statistically validated and evaluated. The results indicated that ES positively affects the level of EMA usage and a positive relationship between EMA and the organizational performance. These findings contribute to the management accounting contingency-based research by providing empirical evidence to support that relationship between ES and EMA as well as between EMA and the organizational performance in the context of developing countries.

1 Introduction

In today’s globalized world, the universal business environment has revealed a growing rate of transformation and competition, both locally and internationally. Technological improvements continue to drive change at an increasing rate, not least in the changes to business practice (Otley, 1980; Zimmerman, 2000). The corporate sustainability and corporate social responsibility have fascinated a substantial consideration from both academics as well as researchers (Nobanee and Ellili, 2015). Commitment to the natural environment has become an important variable (Unamuno, 2006) and behaving in a socially responsible manner is increasingly seen as essential to the long term survival of companies (Adams and Zutshi, 2004). Moreover, the major environmental incidents, such as the Bhopal chemical leak in 1984 in India and the Exxon Valdez oil spill in 1989 in Alaska, have significantly risen the global profile of environmental issues (Shane, 2004). This resulted in increasing the complexity of the business environment as well as the concerns and awareness of the environmental problems by society, which has led firms to confront with environmental issues to manage and reduce their activities’ environmental impact (Saeidi et al., 2011). Responding quickly to the changing market demands is the central key for a company to gain advantage against its competitors (Mokhtar et al., 2016).

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Environmental Management Accounting (EMA) has been given a growing interest in recent years (Christ and Burritt, 2013). EMA is regarded as an extension of conventional management accounting (Chang, 2007). EMA has emerged as a response to the challenges faced by traditional management accounting systems in relation to environmental activities (Ferreira et al., 2010). The great environmental impact and its related costs as well as the failure of conventional accounting systems to provide the information required for reducing these impacts and costs, have led significantly to the emergence of EMA (Gale, 2006a; Jasch, 2006). Various perceptions of the concept and practices of environmental accounting have emerged (Burritt, 2005).

EMA grew from a corporate environmental accounting into an independent area of research covering information and decision systems that would support management to contribute towards sustainability (Debnath and Accountants, 2012). Specifically, EMA has been introduced as a means by which the business community can more simply manage its environmental and related economic performance (Christ and Burritt, 2013). EMA supports the management to contribute towards sustainability (Cullen and Whelan, 2006). It can also support the effort to a sustainable society (Schaltegger and Burritt, 2000). EMA has been introduced as an important strategic management accounting tool to improve a firm’s environmental performance (Schaltegger and Burritt, 2000). EMA could assist organizations face their environmental and social responsibilities and can lead to the identification of combined environmental and economic advantages from corporate actions (Burritt and Saka, 2006; Schaltegger and Burritt, 2000).

Some authors see environmental initiatives and practices as a tool which helps organizations gain competitive advantage and improve overall performance (Claver-corte et al., 2009), However, insufficient relevant environmental information can prevent corporate decision makers from making informed decisions (Mokhtar et al., 2016). By preparing and providing data related to the physical and financial aspects of environmental performance, it has been argued that EMA will provide information that can be utilized by the corporate management to evaluate chances for economic and environmental improvement (Gale, 2006b; Schaltegger and Burritt, 2000).

The relationship between being proactive in environmental issues and firm performance represents a perplexing issue in the literature (López-Gamero et al, 2009). It is still unclear how environmental practices affect a company’s financial performance (San Ong et al, 2016). This is because, some studies have documented a positive relationship while others do not identify a positive impact. Given the increasing importance of environmental management and understanding and developing environmental management relations, developing effective environmental management strategies and having a clear understanding of the environmental management accounting system and the organizational performance will help achieve the firm’s targets.

This study applies the management accounting contingency theory to link the organizational environmental strategy to the level of EMA adoption and to link the EMA adoption to the organizational performance. As a relatively new branch of management accounting, there has not been much discussion on EMA implementation in emerging and developing economies (Herzig et al., 2012). This paper examines the relationship of interest in the context of developing countries. Specifically, the study model was applied to the UAE market. This study is aiming to further extend current knowledge and enrich the theoretical discussions of the subject in the developing countries’ emerging economies context. The results of this study will not only contribute to the literature with a better understanding of EMA adoption in a developing country context, but also will provide a useful guideline to organizations to make decisions in light of the paper results. The paper is organized as follows. Section 2 discuss the EMA development. Section 3 discusses the theoretical framework and hypotheses development. Section 4 discusses the research methodology and the development of the research model that was tested. Section 5 presents the empirical results and analysis. The paper then concludes with a discussion of the statistical outcomes and the overall conclusions, including the suggestions for future research.

2 Environmental management accounting

EMA has become a significant part of the environmental accounting structure (Jamil et al., 2015). It is becoming more important, not only for environmental management decisions, but also for all types of management activi-
ties and the range of decisions affected by environmental issues is increasing (IFAC, 2005). EMA, however, as a growing area of research, has received a relatively little attention from researchers (Ferreira et al., 2010) and theoretically informed projects.

In 2005, the International Federation of Accountants (IFAC) considered EMA as a broad set of principles and approaches that provides the data essential for the accomplishment of various other environmental management activities (IFAC, 2005). EMA has no single universally accepted definition (IFAC, 2005). Rather, there is a range of different perceptions and conceptions of EMA. Previous studies have defined EMA in different ways. For example, Bartolomeo et al. (2000) defined EMA as the creation, analysis and usage of monetary and physical (or financial and non-financial) environment-related information so as to enhance the organizational financial as well as environmental performance (Bartolomeo et al., 2000). According to IFAC’s Statement Management Accounting Concepts, EMA is “the management of environmental and economic performance through the development and implementation of appropriate environment-related accounting systems and practices. While this may include reporting and auditing in some companies, environmental management accounting typically involves life-cycle costing, full-cost accounting, benefits assessment, and strategic planning for environmental management” (IFAC, 2005). A complementary definition is given by the United Nations Expert Working Group on EMA: EMA is broadly defined to be the identification, collection, analysis and use of two types of information for internal decision making: physical information on the use, flows and destinies of energy, water and materials (including wastes), and monetary information on environment related costs, earnings and savings (United Nations, 2001). This definition distinctively highlights both the physical and monetary sides of EMA. The two types of environmental information, physical and non-physical, facilitate the determinations of the size and effect of companies’ environmental effects (Sulaiman and Ahmad, 2006; Schaltegger et al., 2012).

3 Theoretical framework and hypotheses development

Management accounting-contingency theory considered as one of the best generally utilized theoretical methodologies in current management accounting studies, a discipline from which EMA has established. Previous researchers recommended that, contingency theory proposes a suitable underline framework through which one can study topics related to EMA (See Christ and Burritt, 2013). Recent researches have verified the contingency theory’s assumptions to have a substantial probable to further recent knowledge regarding EMA practice and development (Christ and Burritt, 2013). The contingency-based research assumes that management accounting systems are implemented in order to help managers in accomplishing some anticipated organization’s outcomes or goals (Haldma and Meiesaar, 2002).

Researchers argued that organization structures and processes are contingent upon the presence and influence of certain key internal and external environmental variables. Researchers were concerned to identify optimal organization structures and control systems for differing organizational circumstances (Parker, 1997). The management accounting-contingency theory is constructed on the idea that there is no one universally applicable accounting system implemented correspondingly to all organizations under all circumstances (Emmanuel et al., 1990), rather, it is suggested that the particular features of an appropriate accounting system will depend on the specific circumstances in which an organization finds itself. How effective the design of an accounting system depends on its ability to adapt to changes in external circumstances and internal factors (Haldma and Meiesaar, 2002). If a management accounting system is found to be appropriate, then it is likely to provide enhanced information to the individuals who then can take improved decisions and thus achieve the organizational goals in a better way (Haldma and Meiesaar, 2002). Different strategic typologies are employed in contingency-based studies (Christ and Burritt, 2013). Parker (1997) argued that environmental accounting might be contingent on strategy priority for environmental management. Moreover, Chenhall (2003) pointed out that irrespective of the strategic direction implemented, the contingency-based research forecasts that particular techniques will be more appropriate to certain strategies. Chenhall (2003) also confirmed on the arguments above and the contingency theory assumptions, the following framework was proposed: the contingency theory hypothesizes that
when a correct match, or fit, between accounting techniques and context occur, the organizational performance is probable to be enhanced. The following framework in Fig.1 was proposed in this study.

3.1 Environmental strategy and EMA

Business strategies recognize the means by which the organization aims to accomplish its organizational objectives and goals. EMA as a management accounting technique that concentrates on efficiency and effectiveness in the consumption of company’s resources, and as it is vital component of the Management Control Systems (MCS). Thus, if a strategy is a driver of MCS, then it is apparent for it to have an impact on the extent of the EMA usage (Ferreira et al., 2010). Parker’s (1997) results showed that the sophistication of EMA could be contingent on organizations’ environmental strategy. Christ and Burritt (2013) utilized the contingency theory’s assumptions in a research investigating the current and future usage of EMA amongst Australian organizations. They concluded that EMA’s usage was linked to the company’s environmental strategy. The most common strategic classifications utilized in contingency-based researches consist of prospectors, analyzers, defenders build-hold-harvest and product differentiation-cost leadership (Chenhall, 2003). These classifications, however, could be applied to the EMA researches, moreover, there is a conformation for the elaboration of company’s environmental strategy (Christ and Burritt, 2013). Depending on previous studies, it is justified to hypothesize that the EMA usage could be contingent on company’s environmental strategic objectives and goals (Christ and Burritt, 2013). Therefore, this study developed the following hypothesis:

H1: There is a positive relationship between the environmental strategy and the EMA adoption.

3.2 EMA adoption and organizational performance

EMA generate and provide information related to physical and financial components of environmental performance, which can be utilized by top managements to evaluate chances for future improvement in regards to environmental and financial performance (Gale, 2006a; Schaltegger and Burritt, 2000). EMA is promoted as an important tool for organizations that plan to reduce total costs in general and environmental costs particularly, also to soften the environmental consequences of their actions, products and/or services (Hyrslova and Hajek, 2006). Furthermore, the main propose of EMA is to generate and deliver physical information on the consumptions of materials and energy, as well as to provide monetary information on environment-related costs and savings (Bartolomeo et al., 2000; Hansen and Mowen, 2005; IFAC, 2005; United Nations, 2001). The IFAC argues that EMA improved the traditional management accounting system and generate helpful information to organizations in order to manage and enhance the performance and bring about sustainable growth. (IFAC, 2005). Therefore, this study developed the following hypothesis:

H2: There is a positive relationship between the EMA adoption and the organizational performance.

4 Methodology

4.1 Sample and data collection

To measure the study variables and examine the extent of EMA implementation and its association with firm performance, a web-based survey was conducted, and data was collected. The survey was sent to senior managers. The study’s population included all companies listed on the UAE Stock Markets (ADX and DFM) in 2016. The survey was administered from July 2016 to January 2017. Questionnaires were sent to 120 UAE listed firms. Senior managers were asked to answer (26) questions pertaining to the application of EMA practices, environmental strategies and the perceived performance in their firms. Out of 120 of questionnaires, 32 (27%) were returned and found to be usable. The low response rate of 27% was expected since EMA is a new accounting tool in this region. The final sample includes a panel of 32 listed firms.
Table 1 Convergent validity of measurement model.

<table>
<thead>
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<th>Construct</th>
<th>Item</th>
<th>Loadings</th>
<th>AVE</th>
<th>CR</th>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>STR2</td>
<td>0.900</td>
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<td></td>
<td>STR4</td>
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<tr>
<td>Environmental Management Accounting</td>
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Table 2 Discriminant validity of measurement model.

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<th>Performance</th>
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<tr>
<td>Performance</td>
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<td>0.811</td>
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</table>

4.2 Measures

In this research, a questionnaire was constructed based on the instruments derived from previous related studies. The questionnaire was structured into four parts with a total of (26) questions. A rating scale for various categories has been used to elicit responses. In the questionnaire form, the interval scale and category scale are used to identify the firm’s age, size and business industry. The EMA adoption, environmental strategy and
organizational performance were measured as follows:

EMA adoption: is measured using an instrument using (11) indicators. A 5-point Likert Scale is used to examine the respondent’s perception and find out how strongly he or she agrees or disagrees with the statements. This indicates the implementation of EMA practices that reflect the EMA adoption. Some of the items focused on monetary aspects of EMA, while others focused on the physical aspects in the firm. This measure was used by Ferreira et al. (Ferreira et al., 2010). Organizational overall performance: The Likert Scale is used to examine the respondent’s perception toward their firm performance and to find out how they rate their firm performance from Lower to Higher on a 5-point scale on (8) firm performance criteria comparing firm performance to other competitors in the market. This measure was derived from (Cadez and Guilding, 2008).

Organizational environmental strategy: The corporate environmental strategy was measured using an instrument adapted from Banerjee et al. (2003). The instrument incorporated four items, each of which is measured on a five-point Likert scale designed to gauge the extent to which generic, ex ante environmental concerns were integrated with the corporate strategic planning process (from Banerjee et al., 2003). Respondents were asked to indicate the extent to which they agreed with each of the following statements (1 strongly disagrees, and 5 strongly agree).

5 Result

5.1 Measurement model evaluation

The measurement model, the convergent validity and the discriminant validity were evaluated in this study. The convergent validity of the measurement model evaluation is usually proven by examining the loadings and the Average Variance Extracted (AVE) in addition to the composite reliability (Hair et al., 2014). The result of this study indicate that, all loadings were higher than 0.7 except for the two items; EMA 10 and EMA 12 which have been removed. The results also showed that, the composite reliabilities were all greater than 0.7, and the AVE values were also greater than 0.5 as recommended by Hair et al. (2014) (see Table 1).

The discriminant validity of the measures was checked based on Fornell and Larcker’s (1981) standard. The discriminant validity was obtained by comparing the correlations of constructs and the square root of the AVE for same construct. Table 2 shows the square root of the AVEs as represented in bolded values on the diagonals was larger than the corresponding row and column values. These values designates that all measures were discriminant. Overall, the convergent as well as discriminant validity of the measures used in this study were proven.

5.2 Structural model evaluation

Assessing the structural model involves evaluating R², Beta and the corresponding t-values (Hair et al., 2014). To obtain the t-values, a bootstrapping procedure with 5000 resamples was applied. In addition to these basic measures, researchers should also report predictive relevance (Q²) and effect sizes (f²) (Hair et al., 2014).

First, we looked at the antecedents to EMA. The results showed that the environmental strategy (β = 0.565, p < 0.00) had a significant effect on the EMA adoption. The results showed that the environmental strategy explained 32.6% of the variance on the EMA adoption. Thus, H1 was supported. Second, we looked at the relationship between the EMA adoption and the organizational performance. The results showed that the EMA...
adoption had a significant positive effect and explained 38% of the variance on the organizational performance ($\beta = 0.614$, $p < 0.00$). Thus, H2 was supported.

The effect sizes ($f^2$) was assessed as well. As asserted by Sullivan and Feinn (2012), “While a P value can inform the reader whether an effect exists, the P value will not reveal the size of the effect. In reporting and interpreting studies, both the substantive significance (effect size) and statistical significance (P value) are essential results to be reported. To measure the magnitude of the effect size, Cohen’s (1988) guideline values was used, which are 0.02, 0.15, and 0.35, representing small, medium, and large effects respectively. Looking at the $f^2$ values in Table 3, it can be observed that two relationships showed large effects. Leadership largely affects EMA ($f^2 = 0.474$), and EMA largely affects the performance as well ($f^2 = 0.604$).

Further to that, the predictive relevance of the model was also assessed by using the blindfolding procedure. Blindfolding is a sample reuse technique that omits every $d$-th data point in the endogenous construct’s indicators and estimates the parameters with the remaining data points (Henseler et al., 2009; Tenenhaus et al., 2005). If the $Q^2$ value is larger than 0, then the model has a predictive relevance for a certain endogenous construct, and the model has no predictive relevance if the value is less than 0 (Hair et al., 2014; Fornell and Cha 1994). Table 3 shows that all the $Q^2$ values are more than 0 as they range from 0.184 to 0.221. This suggests that the model has a sufficient predictive relevance. Hair et al. (2014) also stated that as a relative measure of predictive relevance, values of 0.02, 0.15, and 0.35 indicate that an exogenous construct has a small, medium, or large predictive relevance for a certain endogenous construct. Applying the rule on the results of the study, the $Q^2$ values indicate that the environmental strategy (exogenous construct) has a medium predictive relevance for EMA (endogenous construct). Also, EMA (exogenous construct) has a medium predictive relevance for the organizational performance (endogenous construct).

6 Discussion and conclusions

The purpose of this study was to investigate the relationship between the environmental strategy, the level of EMA usage and organizational performance. To collect the needed data and examine the study’s assumptions, a survey to UAE companies was conducted. Using the Smart-PLS software, the effect of environmental strategy (as an antecedent) on EMA usage has been examined in the first phase in this study. Afterwards, the effect of the EMA usage on the organizational performance was investigated as well. The findings of this study confirm the positive relationship between environmental strategy and the level of EMA usage, as well as the positive relationship between EMA usage and organizational performance. The results are consistent with the basic assumption of the contingency theory, which assume that the usage of management accounting techniques depends on the organizations’ circumstances (Chenhall, 2003).

The significant positive results of this study go in parallel with those of the previous related researches. For example; Christ and Burritt (2013) have found that the EMA usage was associated with environmental strategy, organizational size and environmentally-sensitive industries. Their findings go in line with the contingency-based assumption. Qian et al. (2011) and Qian and Burritt (2009) environmental strategies have a direct effect on environmental accounting in the local government waste management. Moreover, Chong and Chong (1997) indicate that management accounting systems played a significant role in the association between strategy choices and performance.

Moreover, on the other hand, the result of the current study is inconsistent with some other related studies. For example, Agbejule (2005) pointed out that management accounting systems negatively affect performance under low levels of perceived environmental uncertainty.
7 Limitations and suggestions for future research

Even though this study contributes to the body of the knowledge in the EMA area, the findings must be taken with caution as a result of some limitations. First, the study population included only companies listed on the UAE Stock Markets (ADX and DFM) in 2016. The second limitation is related to the nature of data collection in a cross-sectional study where the data is collected at one point in time. Bearing in mind that EMA is a long-term strategic accounting technique that needs time to be built and nurtured to yield results in terms of enhancing organizational performance, a study conducted in a longitudinal framework might be able to illuminate the causal relationships between the factors of concern, which were not seized by the cross-sectional study. It might also be able to provide more accurate results. Finally, based on the results of applying the structural equation modeling, it is clear that the environmental strategy drive the level of the EMA usage. Also, the implementation of EMA enhanced the organizational performance among companies listed on the UAE Stock Markets. However, the result (R² values) suggested that a high percentage of variation was still unexplained, despite its being quite common for a business research to register a low R² values. In other words, the environmental strategy does affect the EMA usage but not strongly enough which suggests that future studies are need to explore other significant drivers to EMA. Although there are several potential limitations, the study represents a significant step forward in the EMA research area.

Taking into account the mentioned limitations, the current study provides some suggestions for future research. Researchers can, in future, replicate this study and use larger samples in various contexts, such as different countries or regions. This would not only enlarge the sample size, but also, more importantly, allow for a direct comparison of model efficacy based on either the firm size or the country designation. Consequently, this would help resolve the issue of the generalizability and allow for a richer analysis of the validity of each hypothesized relationship as well as for the proposed overall framework. Focusing on one industry is recommended for the future research. This study has used a cross-industries sample, but future researches can generate different results if they could focus only on one type of the industry.

As EMA is a relatively new management accounting discipline with on-going development in terms of its conceptual framework, changing the research method to a case study may also benefit future researchers, as it would be able to provide more detail the technical aspects of EMA. One of the main objectives of the current study was to investigate the role of environmental strategy as a driver (antecedent) to the EMA usage. Further research could examine other contingency factors, such as management style and culture, to advance the understanding of the impact of the EMA usage.

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