

# The Perceived Attributes of EMA and its Relation to the Adoption of the Practice: Malaysian Evidence



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**Abstract:** *Environmental Management Accounting (EMA) is an extension to the traditional management accounting that helps the managers to identify environmental costs and realize the impact of their operation towards the environment. The adoption of this practice is critical in order to address environmental issues. However, as most of the practice of EMA is underutilized and diverse, further promotion is needed if it is to help the business to move towards sustainability. Surprisingly, even those firms which are regarded as being more environmentally-sensitive are not necessarily to use environmental management accounting. This has led to the literature gap pertaining factors that influence firms to apply environmental accounting. Therefore, this research is interested in extending the focus of EMA adoption in environmentally sensitive industries and understands the factors influencing them. Based on Diffusion of Innovation (DOI) perspective, this study attempts to look at how accountants perceived EMA and how this may affect the adoption of the system. By utilising a survey, questionnaires were mailed to the accountants of public listed companies in Malaysia. Six attributes namely the cost, relative advantage, compatibility, complexity, compatibility and trialability are tested in this paper to determine the motivations of EMA adoption. The findings of the study are expected to explain the conditions that facilitate the implementation of the practice and help to provide ways to increase the adoption rate among companies.*

**Keywords:** *Environmental Management Accounting, Diffusion of Innovation*

## I. INTRODUCTION

Conventional management accounting system is deemed irrelevant and insufficient to address changes in business operations nowadays, including the importance of tackling the issues of the environment (Doorasamy and Garbharran) [10]. Supposedly, management accounting information is to be used to assist managers in deciding best ways to reduce company's environmental costs and impacts. Thus, adopting a more contemporary method that solves such issues like environmental accounting (especially EMA), is deemed to be a critical step that companies should do, specifically for

companies with larger environmental impact (Dayana, [7]; Frost and Wilmschurst, [12]).

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. 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 significant issue with publics getting more anxious towards the matters (Bakhtiar et al. [3]; Haslinda et al. [16]). Moreover, the concepts and functions of 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 et al. [32]). As the environmental condition may be impacted and worsen due to the negative impacts of business operations, with this affected the community's health and welfare, the use of EMA has the potential to help industries in Malaysia to address environmental issues. This paper aims at providing a picture of the diffusion of EMA and an understanding of how it can further be promoted in order to help the country achieve a balance in its environmental and economic performance.

## II. LITERATURE REVIEW

### A. Environmental Management Accounting

Environmental Management Accounting is a new approach, and so many companies are not aware of its benefits, and its weaknesses are quite unknown. 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, with the majority of studies being documented only through case studies and being prescriptive (Gale [14]; Jasch [18]; Bouma and van der Veen [4]). Little is known about the diffusion status and how EMA actually diffuses in organizations. Those who studies diffusion rate like Gadenne and Zaman [13], Christ and Burritt [6], Osborn et al. [23] and Qian et al. [25] indicate that the application of EMA is not widely implemented and the environmental costing is not holistically developed. In Malaysian context, the growth of Environmental Accounting in the country is still considered low and slow as compared to other Asia-Pacific countries (Williams [30]; Haslinda et al. [16]; Norhasimah et al. [22]).

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Studies specific to EMA in Malaysia remain limited. Only a few studies addressed this issue, such as Che Zuriana et al. [5]; Dayana et al. [8]; Farizah et al. [11]; Maliah and Norsyahida [21]). However, the scope of their study is very limited in terms of the EMA tools investigated and coverage of the population tested. The current study contributes by filling the gap in literature about the diffusion of EMA in a developing country.

## B. Diffusion of Innovation Perspective

Innovation is whatever practice perceived new by others (Rogers [26], p.11). An innovation is either generated or adopted. Meanwhile, diffusion is the process where the innovation being defined as the process where an innovation is conveyed to others via particular channels over time (Rogers [26]). Diffusion refers to the spreading of an “idea” throughout a population composed of potential adopters (Jackson and Lapsley [17]). Given the definitions above, diffusion of innovation refers to the process of spreading new ideas from the source of invention or creation, through many channels of information to their adopters or users (Rogers [26]). The adoption/diffusion model, developed in the United States by Everett Rogers, is a very important model describing a process of change and this publication has been the main source of reference for diffusion researchers. Rogers [26] emphasised that innovations are not equal and may have different rates of adoption. This depends on attributes of the innovation. There are five attributes, namely, the relative advantage, compatibility, complexity, trialability and observability. Wolfe [31] mentioned that rates and patterns of innovation diffusion are influenced by innovation attributes; therefore, ignoring innovation characteristics can lead to confused results in all diffusion research streams.

Relative advantage is the extent to which an innovation is seen to be better as compares to the practice that came before (Rogers [26]). This degree may be measured in terms of convenience, satisfaction, economy, and social prestige. For an innovation to be adopted, potential adopters need to perceive its benefits to surpass the benefits of current practice, for instance, when the new method could lead to a more efficient process, increase productivity, cost-saving etc. (Askarany et al. [2]). Compatibility is the extent to which these innovations are considered in line with organizational values, experiences and needs (Rogers [26]). The third attribute, complexity, is the extent where an innovation is considered hard to use or comprehend (Rogers [26]); an idea that is simpler to understand or use will be adopted more rapidly than one that is not, especially when adoption requires new talents and knowledge. The trialability factor refers to whether the innovation can be put under experiment on a limited basis before people decide whether to adopt it (Rogers [26]). Observability refers to the degree to which the results of an innovation are visible to others (Rogers [26]). If potential adopters can see the positive results, high chances for the idea to be adopted. Basically, both attributes help to promote innovation diffusion by providing information about experiences with the use of that particular innovation within the potential adopter’s immediate environment (Hall [15]). Given that EMA may be conceived as an innovation (Osborn et al. [23]) and is subjected to an innovation cycle of

invention, diffusion, adoption and rejection patterns, Rogers’ [26] diffusion of innovation theory is appropriate in explaining the adoption of EMA among organizations. It is anticipated that all five attributes of EMA as been perceived by the potential adopters would influence the adoption of the practice.

## III. METHODOLOGY

The present study utilized the survey with questionnaire as a tool of data collection. A census was used instead of sampling to attain higher response rate. The survey form was sent to a total of 757 firms from the list of Bursa Malaysia. Of these, 70 forms were returned which corresponded to 9.25 percent of the responses. However, only 67 are usable and included in the analysis. This percentage is small, however, similar to the percentage of other papers that have conducted research on practices of management accounting in Malaysia and have used same group of respondents, for example, Aliza et al. [1] and Tuan Zainun et al. [29]. Smith [27], p.125, commented that it is common for accounting studies to obtain a percentage of less than 25 percent nowadays. Therefore, it is believed that this rate is sufficient and acceptable to run a statistical test, make analysis and draw inferences from it. Despite the low response rate, the parameters of interest of this study have not been subjected to non-response bias/error.

## IV. FINDINGS AND DISCUSSION

**Adoption of EMA.** Adopters and non adopters of EMA were measured through its level of diffusion within company. Table I presents the diffusion process among the respondents. Adopters were measured by the number of respondents who answered that they have an intention to implement EMA, or EMA has been introduced on a trial basis, or EMA has been implemented and accepted in their organisations. Non-adopters are those who answered that they have not considered EMA at all, or have some consideration, or have made the decision not to introduce EMA in their organisations. Therefore, only 14.9% of the respondents can be considered as adopters while the rest are non-adopters. This information is concerning, however; the finding confirms that there is a very minimal adoption of management accounting innovations by companies in Malaysia. This is the situation not only in Malaysia but also in other countries, including developed countries. The results is similar to many previous works such as Christ and Burritt [6], Dayana [7], Kokubu and Nashioka [19] and Lee et al. [20].

**Table I: EMA diffusion.**

	N	%
No discussion	32	47.8
Some considerations	23	34.3
Decision not to introduce	2	3.0
Intends to introduce	2	3.0

**Perceived attributes and the adoption of EMA.** Kendall tau-b is used to test the correlation between perceived attributes of innovation and the adoption of EMA.

However, instead of five innovation attributes as been suggested by Rogers [26], this study includes the factor of “cost” to be tested for EMA adoption. The cost of an innovation represents both the initial investment cost and the operating cost to ensure the smooth use of the innovation (Premkumar and Potter [24]). Studies proved that this factor is significant for companies to adopt particular practices or it can become a barrier for such implementation (Premkumar and Potter [24]; Rogers [26]).

The data from the pre-test conducted for this study have suggested the same thing. Therefore, the factor “cost” will have a significant relationship with EMA and should not be left out in this study. Table II indicates the association between all six attributes and EMA, and the details of all items under each attributes. Only one attribute is found to be significant with the level of EMA diffusion. That factor is relative advantage. Under this factor, two items were found to be significant: first, providing better environmental performance and, second, enhancing a company’s image/reputation ( $r = .289, p = .007$  and  $r = .264, p = .017$  respectively). We can also see that this factor coefficient has a positive sign. This means that the more respondents perceived that EMA would benefit their business, the more likely EMA is to be diffused within their companies. The findings in this study agree with Askarany et al. [2] and Smith et al. [27]. Hall [15], p.12 suggested that the most important factor that determine an adoption is the amount of improvement offered by the innovation over previous system used by the adopter. None of the items for cost, complexity, compatibility and observability was significant. Therefore, while it is hypothesized that attributes of EMA are associated with the diffusion of the practice, only the factor of relative advantage was found to be significant for such.

**Table II: Kendall-tau b for attributes of innovation**

Model	t	Sig.
<u>Cost</u>	-.012	.904
Investment required	-.034	.752
Maintenance cost	.023	.832
<u>Relative advantage</u>	281**	.006
Provide better environmental performance	.289**	.007
Higher economic benefits	.184	.088
Enhance reputation	.264*	.017
<u>Complexity</u>	.002	.986
Enhance production efficiency	.101	.348
Can be learned quickly and easily	-.092	.399
<u>Compatibility</u>	-.070	.498
Compatible with existing processes	-.130	.220
Minor implication for other processes	-.011	.919
<u>Observability</u>	-.048	.649
Benefits are clear and demonstrable	-.001	.995

Benefits easily reported	-.087	.421
<u>Trialability</u>		
Can be implemented on a trial basis	-.090	.402

Meanwhile, binary logistic regression was performed to identify the link of EMA adoption and observed attributes. It appears that the factor of relative advantage have statistically significant effects on the adoption of EMA.

**Table III: Binary Logistic Regression Results**

Model	B	Wald	Sig.	Exp(B)
(Constant)	-8.520	6.051	.014	0.000
Relative advantage	1.883	4.658	.031	6.570
Complexity	0.587	0.940	.332	1.798
Compatibility	-0.048	0.008	.930	0.954
Observability	1.154	2.613	.106	3.171
Trialability	-1.088	2.201	.138	0.337
Cost	-0.935	2.285	.131	0.392

## V. CONCLUSION

Many previous studies have failed to identify the significant factors that influence the adoption of EMA. Besides, limited management accounting studies have used the DOI Theory in their research. The current study provides evidence that the perceived innovation attributes might influence the diffusion of EMA in Malaysia, consistent with the suggestion in DOI Theory, with relative advantage proved as factor to be most significant to explain the adoption of the practice. In fact, the factor of relative advantage has been found to be the only key attribute grouping that influences the adoption of both technological and accounting changes by companies in Malaysia (Smith et al. [28]). This result proves that rational consideration plays role towards the decision to adopt EMA, in which firms are more likely to adopt innovation which its advantages surpass the disadvantages (Askarany et al. [2]). Since the idea of practicing EMA is to have an accounting tool that can help companies in daily routines as planning and making decisions, therefore, companies who perceived EMA as a beneficial tool for them are more likely to adopt the practice. They placed the capability of EMA to enhance the company’s reputation, provide better environmental performance and increase its economic benefits as highly important characteristics that may encourage its adoption. This study has provided some ideas as to how this practice can be promoted further among businesses. In order to enable EMA to be diffused more widely among companies, it is important that the potential users see the system as a helpful method in solving their environmental problems and improve company’s performance, superior to their normal practice. As the results pointed out, because it is important for the company to display a good image and reputation for effective environmental management, an innovation which may offer such assistance will be most likely to be implemented.

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Therefore, it is important for researchers to study on the consequences of EMA adoption and its impact towards the economic and environmental performance of the firm, which this provide an avenue for future research. Results from EMA case studies should also be highlighted and discussed more in a professional network to speed the diffusion of the knowledge and increase the rate of its adoption.

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