

THE PERCEIVED IMPORTANCE OF ENVIRONMENTAL MANAGEMENT ACCOUNTING (EMA): FEEDBACK FROM THE CONSTRUCTION COMPANIES

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ABSTRACT

This paper discusses the perceived importance of environmental management accounting (EMA) obtained from the construction companies. The study utilises self-administered questionnaire to construction companies in Sabah, Malaysia. Two hundred and ninety-nine (299) responses were received and analysed using the Statistical Package for Social Science (SPSS) software Version 22.0. The study found that the construction companies perceived that environmental management accounting (EMA) is highly important. This finding can be used by the stakeholder such as government agencies and policymakers to enhance the use of environmental management accounting (EMA) among the construction companies.

Keywords: construction companies, environmental management accounting (EMA)

Introduction

In general, the Malaysian construction industry is classified into four (4) sectors: residential buildings (construction of houses and buildings), non-residential buildings (construction of all buildings other than residential), civil engineering (construction of public infrastructures such as bridges and highways) and special trade sectors. The economic report 2014/2015 reported that construction sector continued to register a double-digit growth of 14.3% during the first half of 2014. During the period, 19,649 construction projects were undertaken with the contract value of RM50.1 billion. The growth in the construction sector remained stable supported by an expansion in the residential and civil engineering sub-sector.

The government had outlined an economic road map to transform the country and working towards achieving a high-income economy by 2020. At the same time, two (2) fundamental dimensions had been developed for the constructions industry to enhance its role and even its significant importance to the economy. The two (2) dimensions are (1) increase contribution by increasing market size in new and unexplored developing foreign markets, and (2) improve productivity, efficiency, and cost-effectiveness of the domestic construction industry in order to provide comparative advantage to the economy. Because of these reasons, the Construction Industry Master Plan (CIMP) was developed by the industry and for the industry itself. It was developed to overcome some of the weaknesses that were inherent in the industry which includes quality deficiencies, over-dependency of foreign labour, and the low productivity of the construction industry.

The master plan was planned for ten (10) years, from 2006 to 2015 and included seven (7) strategic thrusts. The plans, among others, are to integrate the construction industry value chain to enhance productivity and efficiency, develop human resources capabilities and capacities, strive for the highest standard of quality, occupational safety and health, and environmental practices, leverage on information and communication technology, and strengthen the construction industry's image. In addition, the construction industry can impact on the environment in a number of ways, including emissions to air, energy, land contamination, noise pollution, waste disposal and discharges to water and much of the challenge for accounting has now been reinforced further by the changing societal expectations and ever-growing pressure on improving organizational environmental performance (Heidari, 2012). Ali and Kamarulzaman (2010) revealed that inaccurate or poor estimation of original cost and construction cost underestimation were found to be the main contributors to cost overrun in Malaysia. In addition, incomplete accounting system was listed as common managerial characteristic of failed construction companies (Mahamid, 2012). This implies that they have no good or effective accounting system in managing the construction industry. As a consequence, these indicate that this study examined the perceived importance of environmental management accounting (EMA) because it was found that the system had helped the business in identifying and reducing environmental costs.

Environmental management accounting (EMA) is defined as "...the process of identification, collection, calculation (estimation), analysis, internal reporting and use of information regarding materials and energy, environmental costs as well as of other data regarding costs within decisional process in order to implement convenient decisions competent to contribute to environment protection" (Vasile & Man, 2012, p. 566). Implementing environmental management accounting (EMA) with a cost orientation as a new tool in management accounting acts as a motivation for firms to get them to find new ways and strategies to control and reduce costs and environmental impacts of company activities (Ferreira, Moulang & Hendro, 2010; Jasch, 2005). It may result in a variety of benefits, including to reduced use of input materials and reduced generation of output waste and pollution, increased efficiency, enhanced compliance, more effective product and price decisions and even improved stakeholder relations. Construction activity is one of the major contributors to the environmental impacts, which are typically classified as air pollution, waste pollution, noise pollution and water pollution (Osman, Udin, & Salleh, 2012).

LITERATURE REVIEW

A large number of studies have been covered among academics and scholars, covering different issues and perspectives. Most of the studies have focused more on developed countries, for example, Herzig, Viere, Schaltegger and Buritt (2015) who come out with case studies on South-East Asian economies. Moreover, studies on environmental management accounting (EMA) in Malaysia has been concentrated more on the manufacturing companies. For example, Mohd Fuzi, Habidin, Janudin and Ong (2016) studied the factors and barriers of implementing environmental management accounting (EMA) among the small medium enterprises. They found that the mean score of both monetary EMA and physical EMA is low at 2.483 and 2.560 respectively. Another research conducted by Jamil, Mohamed, Muhammad and Ali (2015) on thirty-two (32) companies from different sectors comprising of chemical/wood, electrical, plastic/rubber, automotive/machinery, food/tobacco and others. They also found that the level of EMA implementation among the manufacturing companies is still weak.

While there are many researches and studies in the field of environmental management accounting (EMA) are available, there is no convincing evidence that the environmental management accounting (EMA) within construction companies had been undertaken. Therefore, this study addresses this gap. This paper aims to investigate the perceived importance of environmental management accounting (EMA) among the construction companies.

RESEARCH METHODS

This study uses construction companies in Sabah as the respondent. According to Construction Industry Development Board (CIDB) Report, as at end of September 2015, there are a total of 10,192 registered contractors in Sabah, ranked as second after Selangor (11,316 registered contractors). For the purpose of the study, the sample from the population of 5,711 active contractors was chosen from the 10,192 registered contractors. However, only those registered as Grade 4 to Grade 7 were selected considering that their paid-up capital between RM150,000 to RM750,000, making the number to 680 contractors. Based on Krejcie and Morgan (1970) guideline, provided with the sampling frame of 680 populations, the sample size of between 242 and 248 is needed. However, to cater for non-responses, a total of 350 respondents or companies were selected as a sample.

This study was conducted through traditional approach whereby each respondent is given a set of self-administered questionnaire to be completed and are asked to send the reply through self-addressed envelope provided during the questionnaire distribution. In some occasions, the researcher waited for the questionnaire to be completed at the same time. Probability sampling is utilised where the respondents were selected using stratified random sampling. Stratified random sampling involves a process of stratification or segregation, followed by random selection of sample for each stratum. The questionnaire was distributed to the officers (owners, general managers, project managers, engineers, finance managers or managerial accountants) as a proxy who is able to provide feedback to the study.

The questionnaire contains two (2) sections. The first section, Section A asks about the profile of respondents and companies, while the second section, Section B asks on the perceived importance of environmental management accounting using a 5-point Likert scale (1 = not at all important, to 5 = very important). The nineteen (19) questions were adapted from Franklin (2009) which consists of four (4) components: production of environmental information, environmental evaluations, compliance of environmental laws, and tracking of environmental cost saving. The coefficient alpha for environmental management accounting (EMA) is .965. The value of more than .70 is reliable and accepted for a measure (Hair, Black, Babin, Anderson, & Tatham, 2006). Consequently, the coefficient alpha of .965 is considered highly reliable.

RESULTS AND DISCUSSION

Out of the 350 distributed questionnaires, 299 were returned by the respondents. The responses were analysed using Statistical Package for Social Science (SPSS) software Version 22.0. Table 1 shows the demographic profile of the respondents. 107 (41.2%) are aged between 36 to 45 years old, 189 (63.2%) are male, 77 (25.8%) are from others position, 99 (33.1%) holds bachelor's degree, and lastly, 124 (41.5%) has worked between 2 to 5 years.

Table 1: Demographic Profile of Respondents

Items		Frequency	Percent
Age	Below 25 years	28	10.8
	25-35 years	89	34.2
	36 – 45 years	107	41.2
	46 years and above	36	13.8
Gender	Male	189	63.2
	Female	110	36.8
Position	Owner	73	24.4
	Project Manager	54	18.1
	Accountant	53	17.7
	Engineer	42	14.0
	Others	77	25.8
Highest Education	Certificate	29	9.7
	SRP/LCE	17	5.7
	SPM/MCE	66	22.1
	Diploma	78	26.1
	Bachelor's Degree	99	33.1
	Master's Degree	8	2.7
	Others	2	.7

No. of Years Working in the Company	Below 2 years	34	11.4
	Between 2-5 years	124	41.5
	Between 6-10 years	85	28.4
	10 years and above	56	18.7

Table 2 shows the demographic profile of the companies. 35.5% of the companies are from Grade G4, 42.1% (126) employes from 10- 50 employees and 75.6% (226) are located at Pantai Barat Selatan.

Table 2: Demographic Profile of Companies

Items		Frequency	Percent
Grade of Company	G4	106	35.5
	G5	64	21.4
	G6	68	22.7
	G7	61	20.4
Number of Employees	Below 10	77	25.8
	10 to 50	126	42.1
	51 to 100	57	19.1
	101 and above	39	13.0
Company's Location	Pantai Barat Selatan	226	75.6
	Tawau	45	15.1
	Pedalaman Atas/Bawah	23	7.7
	Sandakan	5	1.7

Frequency and descriptive statistics for the first component (production of environmental information) are presented in Table 3. The highest response recorded for all items is 'Fairly Important'. For example, the statement "The EMA system will be able to provide very accurate information on environmental management" was recorded 149 (49.8%), whilst the statement "The EMA system will be able to provide adequate information on environmental management" was recorded 146 (48.8%), and the statement "The EMA system will be able to support internal decision making" recorded 149 (49.8%). It can be concluded here that the construction companies in Sabah are aware of the importance of production of environmental information.

Table 3: Frequency and Descriptive Analysis of Production of Environmental Information, N = 299

No.	Items		Not at all Important	Slightly Important	Important	Fairly Important	Very Important	Mean	Remarks
1.	The EMA system will be able to provide very accurate information on environmental management	f	4	22	82	149	42	3.68	High
		%	1.3	7.4	27.4	49.8	14.0		
2.	The EMA system will be able to provide timely information on environmental management issue.	f	0	28	74	156	41	3.70	High
		%	0.0	9.4	24.7	52.2	13.7		
3.	The EMA system will be able to provide adequate information on environmental management.	f	2	28	78	146	45	3.68	High
		%	.7	9.4	26.1	48.8	15.1		
4.	The EMA system will be able to provide very reliable information on environmental management.	f	1	27	80	133	58	3.74	High
		%	.3	9.0	26.8	44.5	19.4		

Table 3 (Continued):

No.	Items		Not at all Important	Slightly Important	Important	Fairly Important	Very Important	Mean	Remarks
5.	The EMA system will be able to provide very concise information on environmental management.	f	1	27	93	146	32	3.61	High
		%	.3	9.0	31.1	48.8	10.7		
6.	The EMA system will be able to support internal decision making.	f	2	21	88	149	39	3.68	High
		%	.7	7.0	29.4	49.8	13.0		
7.	The EMA system will be able to communicate with other stakeholders on environmental impacts associated with our company operations	f	3	25	84	143	44	3.67	High
		%	1.0	8.4	28.1	47.8	14.7		

Table 4 presents the frequency distributions and descriptive statistics for the second component of environmental management accounting (EMA). It consists of four (4) items which asked about the importance of environmental management accounting (EMA) in terms of environmental evaluation. As shown, the highest response recorded for all items is 'Fairly Important'. For

example, the statement “The EMA system will be able to evaluate compliance with environmental legislation and regulations” recorded 160 (53.5%) and the statement “The EMA system will be able to measure company activities that do have a significant impact on the environment” recorded 147 (49.2%).

Further, the cumulative percentage of those responded with ‘Slightly Important’ and below for all the four (4) items are not more than 11.4%. In terms of mean value, the analyses show that the range of mean value is from 3.67 to 3.78. It can be concluded here that the construction companies in Sabah are aware of the importance of environmental evaluation.

Table 4: Frequency and Descriptive Analysis of Environmental Evaluation, N = 299

No.	Items		Not at all Important	Slightly Important	Important	Fairly Important	Very Important	Mean	Remarks
1.	The EMA system will be able to evaluate compliance with environmental legislation and regulations.	f	1	25	73	160	40	3.71	High
		%	.3	8.4	24.4	53.5	13.5		
2.	The EMA system will be able to investigate the hazardous waste disposals	f	3	32	62	148	54	3.73	High
		%	1.0	10.7	20.7	49.5	18.1		

Table 4 (Continued):

No.	Items		Not at all Important	Slightly Important	Important	Fairly Important	Very Important	Mean	Remarks
3.	The EMA system will be able to measure company activities that do have a significant impact on the environment.	f	5	27	75	147	45	3.67	High
		%	1.7	9.0	25.1	49.2	15.1		
4.	The EMA system will be able to ensure the company objectives are continual with environmental management performance.	f	3	27	64	143	62	3.78	High
		%	1.0	9.0	21.4	47.8	20.7		

Table 5 presents the frequency distributions and descriptive statistics for the third component of environmental management accounting (EMA). It consists of four (4) items which asked about the importance of environmental management accounting (EMA) in terms of compliance with environmental laws. As shown in the table, the highest response recorded for all items is ‘Fairly Important’. For example, the statement “The EMA system will be able to ensure that the documented environmental policies are always availed to all our staff in the company” recorded 148 (49.5%) and the statement “The EMA system will be able to provide formal policy regarding material/resource conservation, reduction, re-use and recycling” recorded 159 (53.2%).

Further, the cumulative percentage of those responded with ‘Slightly Important’ and below for all the four (4) items are not more than 9.0%. In terms of mean value, the analyses show that the range of mean value is from 3.65 to 3.80. This shows that the construction companies in Sabah were perceived that the compliance of environmental laws is highly important.

Table 5: Frequency and Descriptive Analysis of Compliance With Environmental Laws, N = 299

No.	Items		Not at all Important	Slightly Important	Important	Fairly Important	Very Important	Mean	Remarks
1.	The EMA system will be able to ensure that the documented environmental policies are always availed to all our staff in the company	f	2	25	87	148	37	3.65	High
		%	.7	8.4	29.1	49.5	12.4		
2.	The EMA system will be able to ensure that adequate resources are available to implement and control environmental management system in our company.	f	3	22	61	159	54	3.80	High
		%	1.0	7.4	20.4	53.2	18.1		

Table 5 (Continued):

No.	Items		Not at all Important	Slightly Important	Important	Fairly Important	Very Important	Mean	Remarks
3.	The EMA system will be able to provide formal policy regarding material/resource conservation, reduction, re-use, and recycling.	f	1	25	67	159	47	3.76	High
		%	.3	8.4	22.4	53.2	15.7		
4.	The EMA system will be able to identify operations that are significantly related to environment concerns.	f	1	25	78	147	48	3.72	High
		%	.3	8.4	26.1	49.2	16.2		

Table 6 presents the frequency distributions and descriptive statistics for the fourth component of environmental management accounting (EMA). It consists of four (4) items which asked about the importance of environmental management accounting (EMA) in terms of tracking of environmental cost savings. As shown in the table, the highest response recorded for all items is 'Fairly Important'. For example, the statement "The EMA system will be able to provide adequate expertise that is able to carry our tracking of environmental management aspects" recorded 132 (45.2%) and the statement "The EMA system will be able to monitor trends in consumption of natural resources like water, energy, forestry and so on" recorded 150 (50.2%).

Further, the cumulative percentage of those responded with 'Slightly Important' and below for all the four (4) items are not more than 11.4%. In terms of mean value, the analyses show that the range of mean value is from 3.65 to 3.79. This shows that the companies were perceived that the tracking of environmental cost saving is highly important.

Table 6: Frequency and Descriptive Analysis of Environmental Cost Saving, N = 299

No.	Items		Not at all Important	Slightly Important	Important	Fairly Important	Very Important	Mean	Remarks
1.	The EMA system will be able to provide adequate expertise that is able to carry our tracking of environmental management aspects.	f	1	25	83	135	55	3.73	High
		%	.3	8.4	27.8	45.2	18.4		
2.	The EMA system will be able to track chemical use through material accounting in addition to tracking environmental releases.	f	4	27	86	134	48	3.65	High
		%	1.3	9.0	28.8	44.8	16.1		

Table 6 (Continued):

No.	Items		Not at all Important	Slightly Important	Important	Fairly Important	Very Important	Mean	Remarks
3.	The EMA system will be able to monitor trends in consumption of natural resources like water, energy, forestry etc.	f	5	29	67	150	48	3.69	High
		%	1.7	9.7	22.4	50.2	16.1		
4.	The EMA system will be able to ensure that adequate resources are available to implement and control environmental management system in our company.	f	2	23	77	131	66	3.79	High
		%	.7	7.7	25.8	43.8	22.1		

On overall, the output displayed in the four (4) preceding tables show that the construction companies were perceived that the environmental management accounting is highly important.

CONCLUSION

From the analysis, it was found that the construction companies perceived that environmental management accounting (EMA) is highly important. This shows that they are aware of its importance. Further, the Construction Industry Master Plan (CIMP) 2006 – 2015 has identified the future challenges on environmental practice and new construction method as mentioned in Strategic Thrust 3 (Strive for the highest of quality, occupational safety and health and environmental practices) and Strategic Thrust 5 (Innovate through R&D to adopt a new construction method). Therefore, in this effort, Malaysian construction industry has been urged to use Green Technologies and to shift from conventional practice to greener practices (Osman, Udin, & Salleh, 2012). This can be realised if the environmental management accounting (EMA) is applied in the related companies. Therefore, these findings may give some insight to the government agencies and the policy makers on its actual implementation. As for future

research, a better understanding of the factors that influence the implementation of environmental management accounting (EMA) is suggested to be studied.

ACKNOWLEDGEMENT

The author would like to thank the anonymous the anonymous reviewers for their helpful and constructive comments that greatly contributed to improving the final version of the paper.

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