

Bibliometric Analysis of Literatures on Environmental Management Accounting Between 2017- end off Aug 2021

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Abstract. Environmental problems are problems that do not escape the results of a company's operations, therefore environmental management accounting as an intermediary for companies in linking company costs with consequences for the surrounding environmental in order to help companies reduce environmental risks that occur. The purpose for this study is to investigate the literature related to environmental management accounting from 2017 to the end of August 2021. The methodology used in descriptive obtained from document of analysis in previously study, literature environmental management accounting both derived from Article obtained from Scopus source. There were 75 articles found on environmental management accounting. This research is described from various points of view such as subject and author gender, research variables, total published articles and research approach. The general findings of this study illustrate that most of the previous studies discussing environmental management accounting were influenced by several factors such as institutional pressure and others.

Keywords: Environmental Accounting Management.

1. Introduction

The environment is a social place for companies that have a long-term vision to strike a balance in managing the company in various ways with the aim of achieving profits for investors and the sustainability of the company. Environmental problems are inseparable from social life, especially business entities operating around the community. Environmental costs, material and energy information are important concerns for companies in managing environmental balance from a financial and non-financial perspective, in this case included in environmental management accounting(EMA). EMA is a very important thing for companies to do in measuring the impact and environmental performance that occurs due to the company's operations.

Previous research that environmental management accounting is one solution to overcome non-financial problems in the form of social & environmental protection Environmental Management Accounting explains in detail environmental information(Monetary & Physical) into efficiently use natural resources and stop negative effect on environment [1]. Final result of EMA is to provide clear recommendations regarding costs and environmental issues so that management get effective for decisions managing company on a sustainable manner's [2]. The fact is

implementation EMA for get decision in organizations or especially in companies is still low and very little [3].

2. Literature Review

2.1 Concept EMA

Environmental-Accounting (EA) as a major concept of EMA. EMA is process managing cost on environment by managerial create added value for the company from a non-financial perspective. EMA can control and reduce the impact of companies production activity and maximize use resources. EMA can be assessed from type physical & monetary information. EMA research starts from research [4] who said that it is necessary to develop environmental accounting to create management that is more concerned with the environment. This is confirmed by [5] Companies need additional information about the environment to address environmental uncertainties that have an impact on the company.

Companies that have complex management accounting information and high environmental uncertainty indicate the performance of managers in controlling information from a non-financial perspective [6]. This accounting crisis will develop in line with other fields of study where risk and uncertainty need financial statements to estimate good results [7]. management accounting system information and company performance can be traced as a result of the company ignoring environmental conditions [8]. Therefore, the availability of environmental management accounting information is needed for companies.

A cost accounting system is a system that acts as a supporter of various environmental management systems with the benefit of making decisions for environmental investment that must consistent with goals and objectives of the appropriate environmental management system[9]. The environmental accounting system started from exploration and production operations which developed into a system that is closely related to managers and technicians in a company organization [10]. As mentioned [11] Companies now need to incorporate these future cost estimates and with full costing of environmental or analysis of life cycle. One of the important things in the management accounting system is improving performance and managing environmental uncertainties that occur [12]. In addition, in addition to managing environmental uncertainty, a performance strategy is also needed in the design of management accounting information systems [13].

Company managers will get management accounting system information in solving complexities due to environmental uncertainty [14]. Natural Resources Accounting Approach to Environmental Management and Integrated Economic Planning is one of the environmental accounting approaches that has been carried out by [15] with advantages that indicator's of welfare and macro economic capacity results by Natural Resources Accounting Approach, and information natural impact of economic continuity is notified. Then other management accounting systems in environmental management, namely supply and strength in accounting such as Life Cycle Analysis(LCA) and Material Flow Analysis(MFA) in describing the ecological impact of products or assessing companies so that they can be compared and assessed. LCA and MFA which consider ecological, economic and social criteria to describe and evaluate environmental impacts [16].

2.2 The Benefit of EMA

EMA description is managing economic and environmental performance by developing and implementing appropriate environmental accounting practices and systems. [17].

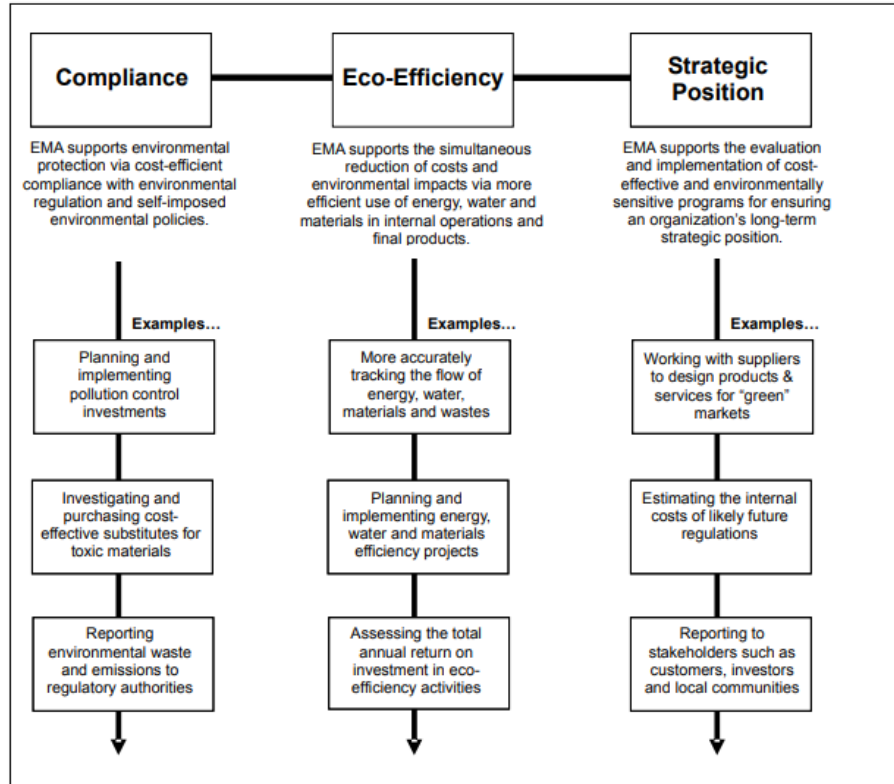


Fig 1. Benefit of Environmental Management Accounting

There are three benefits in implementing environmental management accounting, all that is Compliance. Eco Efficiency and last, Strategic Position [17].

3. Methodology

The article uses a bibliometric with analysis of descriptive grounded on the literature on environmental management accounting between 2017 and the end of August 2021. A total of 75 articles have been obtained for research based on published or perish with the reference Scopus. In the form of articles, conference papers and journals. This article undertakes a bibliometric review

with a particular focus on articles written in the field of EMA. Literature creation and treatise will be explanation to get data covering EMA that use by all user for improve EMA.

4. Result

4.1 Country and year of article

Table 1. Country and year of article

No	Country	Period				
		2017	2018	2019	2020	2021
1	Sri Lanka [18]					√
2	Sri Lanka [19]					√
3	Iran [20]					√
4	Malaysia [21]					√
5	Uganda [22]					√
6	China [23]					√
7	Indonesia [24]					√
8	Pakistan [25]				√	
9	Pakistan [26]				√	
10	Middle East and North Africa [27]				√	
11	Nigeria and South Africa [28]				√	
12	Thailand [29]				√	
13	China [30]				√	
14	Indonesia [31]				√	
15	Indonesia [32]				√	
16	Malaysia [33]				√	
17	Bahrain [34]				√	
18	Vietnam [35]				√	
19	Serbia [36]				√	
20	Pakistan [37]				√	
21	Brazilian [38]				√	
22	Malaysia [39]				√	
23	Mesir [40]				√	
24	Malaysia [41]				√	
25	Libya [42]				√	
26	Indonesia [43]				√	
27	Malaysia [44]				√	
28	Malaysia [45]				√	
29	Vietnam [46]				√	
30	Czech [47]				√	
31	Indonesia [48]				√	
32	Indonesia [49]				√	
33	Indonesia, Philippinean & Vietnam [50]			√		

34	Brazilian [51]	√
35	Indonesia [52]	√
36	India [53]	√
37	China [54]	√
38	Australia [55]	√
39	Pakistan [56]	√
40	Malaysia [57]	√
41	Indonesia [58]	√
42	Vietnam [59]	√
43	Not state [60]	√
44	Vietnam [61]	√
45	Indonesia [62]	√
46	Malaysia [63]	√
47	Indonesia [64]	√
48	Indonesia [65]	√
49	Malaysia [66]	√
50	Indonesia [67]	√
51	Thailand [68]	√
52	Malaysia [69]	√
53	Indonesia [70]	√
54	US, Germany, Australia and Japan [71]	√
55	Not state [72]	√
56	Not state [73]	√
57	Not state [74]	√
58	Not state [75]	√
59	Iran [76]	√
60	Australia [77]	√
61	United Arab Emirates [78]	√
62	Not state [79]	√
63	Malaysia [80]	√
64	Bahrain [81]	√
65	Malaysia [82]	√
66	Iraq [83]	√
67	Indonesia [84]	√
68	France [85]	√
69	Australia [86]	√
70	Iran [87]	√
71	India [88]	√
72	Germany [89]	√
73	Not State [90]	√
74	South Africa [91]	√
75	Malaysia [92]	√

From the journal publication table 1, we have 23 country, publish 68 article's with subject EMA which have been identified from their country of origin, 7 articles were not identified. The dominating countries came from Indonesia with 14 articles and Malaysia with 13 articles.

4.2 Journal Publication in Annual

Table 2. Journal Publications Journal Publication in Annual

Period	Total article's
2021	7
2020	25
2019	20
2018	14
2017	9

Until end off August, 2021 we find 7 articles, 25 articles were produced in 2020, the most from the year of observation. In 2019, 20 articles were produced. Meanwhile, in 2018 and 2017 there were 14 articles and 9 research articles on environmental management accounting. From this it proves that research on environmental management accounting is relevant every year because the development of technology based on the environment is growing rapidly.

4.3 Research Methods

Table 3. Research Methods

Period	Research Methods			Total
	Qualitatif	Quantitatif	Mix-Method	
2017	68,71,72,73, 74,75	67,69,70		9
2018	55,56,57,58, 62,65,	53,54,59,60,61, 63,64,66		14
2019	33,36,38,43,	34,35,37, 39,40,41,42,45, 46,47,48,49,50, 51, 52	44	20
2020	23,30	8,9,10,11,12,13, 14,15,16,17,19, 20,21,22,24,25, 26,27,28,29,31, 32,	18	25
2021	2,6,	1,3,4,5,7		7
TOTAL	20	53	2	75

In Table-3, it can be concluded that the use of research methods for 5 years with a total of 75 articles consisting of qualitative, quantitative, and mixed methods research methods. Quantitative method is recorded as the largest compared to other methods with a total of 53 studies, then qualitative methods with a number of 20 studies, while the mix method is not so popular in environmental management accounting research with a total of 2 studies

4.4 Study Type

Table 4. Study Type

Period	Analysis of Data				Total
	Exploratory Research	Descriptive Research	Analytical Research	Empirical Research	
2017	68,74,75	67,69,70	71,72,	73	9
2018	56,65	53,54,59,60, 61,63,64,66	57,62	55, 58,	14
2019	33,	34,35,37,39,40,41,42,45,46,47,48,49,50,51, 52	36, 38,43,44		20
2020	23	8,9,10,11,12,13,14,15,16,17,18,20,21,22,24, 25, 26,27,28,29, 32	30	19,31	25
2021		1,3,4,5,7,	2,6		7
TOTAL	7	52	11	5	75

Table-4 explains that environmental management accounting research in the period of observation uses 4 research approaches, namely exploratory, descriptive, analytical, and empirical. From this research approach, it was obtained that based on an analysis conducted on 75 articles, the largest is the descriptive approach method with a total of 52 articles, the analytical approach has a total of 11 articles and the explanatory and empirical research is not much different with a total of 7 articles and 5 articles.

4.5 Gender of Author

Table 5. Gender of Author

Gender	Author					Total
	1	2	3	4	5 & above	
Male.	55,58,62,64,66,67,68, 74	2,8,23,27,30,36,39,48,56,59,70,72, 73,75	1,5,10,12,15,17, 25,29 37,38, 47, 51,54, 60	3, 49, 61, 65, 71		41
Female	14	31		45		3
Mixed Gender		7,41, 44	4,6,11,21,22,32, 34, 35,40, 42,50, 69	13, 16, 18, 19, 20, 28, 33, 43, 46, 63	9,24, 26,52, 53,57	31
						total
						75

Regarding gender and participation in research, table above shows that there are three categories of research, namely Male, Female and Mixed Gender with various authors' participation starting with alone, together or even more than 5 authors. It is recorded in the table that environmental management accounting research is dominated by a total of 41 people, while only 3 female researchers, however, mixed gender has a fairly large value with a total of 31 people

4.6 Country and number of articles

Table 6. Country and number of articles

No	Publishing Country	Number of articles published from year 2017 to 2021	TOTAL
1	Sri Lanka	1,2,	2
2	Iran	3, 59, 70	3
3	Malaysia	4,16,22,24,27,28,40,46,49,52,63,65,75	13
4	Uganda	5,	1
5	China	6,13,37	3
6	Indonesia	7,14,15,26,31,32,35,41,45,47,48,50,53,67	14
7	Pakistan	8,9,20,39	4
8	Middle East and North Africa	10	1
9	Nigeria and South Africa	11	1
10	Thailand	12,51,	2
11	Bahrain	17,64,	2
12	Vietnam	18,29,42,44,	4
13	Serbia	19,	1
14	Brazilian	21,34,	2
15	Mesir	23	1
16	Libya	25	1
17	Czech	30	1
18	Indonesia, Philippine, Vietnam	33	1
19	India	36,71	2
20	Australia	38,60,69	3
21	US, Germany, Australia and Japan	54	1
22	Germany	72	1
23	France	68	1
24	United Arab Emirates	61	1
25	Iraq	66	1
26	South Africa	74	1
27	Not State	43, 55, 56, 57, 58, 62, 73	7
	TOTAL		75

Based on the table above, 14 publications were recorded for Indonesia with the highest number of articles compared to others. The next highest number of articles was published by Malaysia 13 publications. The third is not state as many as 7 publications., Pakistan and Vietnam have 4 article publications, while the total 3 publication articles from Iran, China, and Australia. Brazillia, and which has 2 articles published in Sri Lanka, Thailand, Bahrain, Brazil, India, while other countries only have one article published.

5. Discussion

Based on the results of the 2017-2021 investigation (end of August) obtained from an analysis of 75 articles:

- 1) Research on EMA every year have a significant increase every year, this reflects that research on this field is still very much needed throughout the year because it is always related to the surrounding environment.
- 2) Research on EMA, many researchers use quantitative methods rather than qualitative or mixed methods from time to time
- 3) The researchers describe the overall environmental management accounting with descriptive analysis so that readers get a detailed picture
- 4) Research writing pattern illustrated that the number with the most articles are written by male and mixed gender authors.
- 5) Largest articles associated with EMA was contributed by Indonesia and Malaysia because they are countries that have companies that are developing in all industrial sectors.

6. Conclusions

From previous studies, it can concluded where company management, practitioners and academics must always keep abreast of developments related to environmental costs, especially environmental management accounting which is always growing rapidly to reflect the company's performance from a non-financial perspective which has a direct influence on the surrounding company. Results of analysis all articles on EMA, we can conclude that this research is still very relevant to be developed because environmental factors are very fundamental for the sustainability of the company which is always a problem or impact of the company.

7. Limitation

This study has a limited research time span, therefore, researchers need to stay focused and update research on developments from time to time regarding environmental management accounting in achieving better knowledge in the industry as a reference for further researchers. For next research, recommended to develop the scope of time and research area of countries that have similarities that can be generalized at a later date from the results of the research.

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