

## Environmental Management Accounting in Indonesia: Current Status and Future Research

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### Abstract

Environmental Management Accounting (EMA) is an important management accounting practice for a company to ensure that the achievement of corporate goals is in line with environmental interests. Literature related to the application of EMA in Indonesia is still limited, so this study intends to analyze previous studies related to EMA in Indonesia, in order to provide an overview of the latest trends and future research ideas. The method used is literature review of articles published in Indonesian journals that have been accredited by SINTA. Data was collected from 329 journals in the economic area, resulting in a total of 22 articles which spread across 18 different journals. Based on the results of the analysis, it can be concluded that the most dominant topic is the implementation of EMA and the link between EMA and firm performance, the most frequently used settings are manufacturing companies and other non-financial companies, legitimacy theory and stakeholder as the most popular theory used, the majority of data collection used archival or interview methods, and the most popular data analysis techniques are content analysis, regression, and SEM-PLS. Through this research, it is hoped that academics can obtain new ideas regarding research opportunities in the future, hence they can enrich the EMA-related literature as well as increasing awareness regarding the importance of EMA for companies.

**Keywords:** Environmental Management Accounting, Literature Review, Indonesia

### INTRODUCTION

Nowadays, environmental aspects are becoming increasingly common for companies and governments to pay attention to. Simply put, quite a number of companies have issued sustainability reports as an effort to be accountable to the public and to show that the business they manage is ethical and does not harm society and the environment. Apart from being used as a material consideration for investors when choosing a company as an investment target, environmental aspects are also widely considered when a company has to undergo a feasibility study related to a business unit or project. As a result, it is not uncommon for managers to consider environmental aspects when making decisions.

Nearly all types of business aspects are affected by environmental pressures, including accounting. In relation to management accounting, top management in a company always faces many considerations when making decisions that are in line with the company's strategy and objectives. Along with the increase of global business and information, the global society is now increasingly concerned about the impact that companies have on society and the environment. One aspect that is often discussed is the role of companies in helping the achievement of the Sustainable Development Goals (SDGs) by the United Nations (UN). This is because Indonesia, as a member of the UN, cannot achieve the SDGs without the support from its citizens, including companies and business people.

Referring to the SDGs, there are three pillars that need attention, namely environmental sustainability, economic sustainability, and social sustainability (Mangukiya & Sklarew, 2023).

Environmental Management Accounting, defined by Herzig et al. (2012, p.1) as “a concept of sustainability management which comprises a set of accounting tools and practices to support managerial decision-making on environmental and economic performance”, is one of the answers from these two pillars, namely the environmental and economic pillars .

As is the broad area of management accounting, so is the area of EMA. To understand and implement EMA, company and its managers also need sufficient knowledge of environmental management, management accounting and control, environmental and sustainability accounting, environmental information systems, management systems and so forth (Herzig et al., 2012). Furthermore, EMA can be applied in various aspects and activities within the company, such as environmental costing, environmental life cycle assessment, environmental performance and environmental reporting.

Good EMA practice in a company has shown a good effect for the company. In addition to providing environmental and other cost information, EMA also provides particular data on the physical flows and fates of materials and energy. This is supported by Herzig et al. (2012) who have examined various case studies in Southeast Asia, that EMA can help to support operational management and investments which are in line with the efficiency of materials and energy; support strategic investment decisions about new environmental technologies and assets; and support the measurement and enhancement of supply chain-related eco-efficiency. Besides economic efficiency, the case studies also reveal further motivations for EMA use, which is the reduction of long term environmental risks and increased legality and legitimacy. Apart from being useful for internal company decision-making and providing confidence to stakeholders, the application of EMA can also help ease the government's role in ensuring that its sustainability goals will be achieved, considering that the performance of a company will more or less be reflected in the performance of a country.

This study intends to analyze articles related to EMA in SINTA (Science and Technology Index) indexed journals in Indonesia. Thus, trends related to research in the EMA field can be identified, and can be known which aspects are still not explored by researchers so that they can be used as references for further research. This opportunity for further research needs to be taken up by other researchers, with the consideration that EMA is closely related to the SDGs, which of course is still and will continue to be the focus of academic discussion both orally and in writing.

## RESEARCH METHOD

This research is a qualitative research with literature review method. The data used in this research is secondary data, namely in the form of articles available in selected journals. The focus of this research is on articles that have been published in SINTA accredited economic area journals, which at the time this research was conducted totaled to 329 journals. The selection of the journal population is based on two considerations, namely: (1) The scope of the journal is specifically devoted to publication of research in the economic field, so that the potential for EMA articles is higher, (2) The quality and credibility of the journal is quite good and has been recognized by Ministry of Education, Culture, Research and Technology of Indonesia. The classification and analysis of the articles development on the topic of EMA in these journals was done by applying the methods used in previous studies.

The search of articles that are relevant to the topic is done manually by reading the list of article titles published on the 329 journal sites above. Articles with titles that seem appropriate to the topic are then studied to ensure their relevance. The author searches for articles with search keywords such as “environmental management accounting” and “environmental management accounting”. Each relevant article that appears based on these keywords is then reassessed for its relevance based on its abstraction.

From the data collection process carried out, there are a total of 22 EMA topic articles that are successfully obtained. The articles are obtained from a total of 18 different journals, which are accredited by Sinta 2 to Sinta 5, with detailed information as follows:

**Table 1.** Journals containing relevant EMA articles

Journal Name	Publisher	Year Begin	SINTA
Journal of Economics, Business, & Accountancy Ventura	PPPM STIE Perbanas Surabaya	1998	S2
Jurnal Ekonomi dan Bisnis	Fakultas Ekonomika dan Bisnis Universitas Kristen Satya Wacana	1998	S2
Media Riset Akuntansi, Auditing & Informasi	Lembaga Penerbit Fakultas Ekonomi Universitas Trisakti	2001	S2
Jurnal Akuntansi dan Auditing	Departemen Akuntansi FEB Universitas Diponegoro	2004	S3
Jurnal Ilmiah Akuntansi dan Bisnis	Fakultas Ekonomi dan Bisnis Universitas Udayana	2006	S2
Jurnal ASET (Akuntansi Riset)	Fakultas Pendidikan Ekonomi dan Bisnis Universitas Pendidikan Indonesia	2009	S2
Jurnal Dinamika Akuntansi	Departemen Akuntansi FE Universitas Negeri Semarang	2009	S2
Binus Business Review	Bina Nusantara University	2010	S2
Performance: Jurnal Bisnis & Akuntansi	Fakultas Ekonomi dan Bisnis Universitas Wiraraja	2011	S4
Jurnal Riset Akuntansi dan Keuangan	Fakultas Pendidikan Ekonomi dan Bisnis Universitas Pendidikan Indonesia	2013	S3
Krisna: Kumpulan Riset Akuntansi	Program Studi Akuntansi Universitas Warmadewa	2013	S4
Jurnal Riset dan Aplikasi: Akuntansi dan Manajemen	Jurusan Akuntansi Politeknik Negeri Malang	2015	S3
Shirkah: Journal of Economics and Business	Fakultas Ekonomi dan Bisnis Islam IAIN Surakarta	2016	S2
The Accounting Journal of Binaniaga	P3M Sekolah Tinggi Ilmu Ekonomi Binaniaga	2016	S5
International Business and Accounting Research Journal	Sekolah Tinggi Ekonomi dan Bisnis Islam Lampung	2017	S2
JIMEA Jurnal Ilmiah MEA (Manajemen, Ekonomi, dan Akuntansi)	Sekolah Tinggi Ilmu Ekonomi Muhammadiyah Bandung	2017	S4
Owner: Riset & Jurnal Akuntansi	Program Studi Akuntansi Politeknik Ganesha	2017	S3
JAKA (Jurnal Akuntansi, Keuangan, dan Auditing)	Universitas Dian Nuswantoro	2020	S5

The analysis and writing of this research is based on the research framework of Hoque (2014). According to this framework, articles are classified and percentages are made based on (a) topics, (b) research settings, (c) research theories, (d) research methods, dan (e) primary data analysis techniques.

## RESULTS AND DISCUSSION

### Article Frequency Distribution

After the search of the articles, 22 (twenty-two) articles are collected and considered relevant to the Environmental Management Accounting (EMA) topic. All of these articles discuss EMA, with different focus.

Table 2 shows the frequency distribution of the number of articles on EMA topics that have been published in each journal. Although several journals have been established since the 1990s and early 2000s, articles on EMA topics only started appearing in the 2010s. To simplify viewing, only the twelve year period from 2012 to 2023 is shown in the research results tables. Then to simplify the depiction in the table, the period is divided into three periods.

In the period from 2012 to 2015, only one relevant article was published. Furthermore, five relevant articles were published in 2016 to 2019, and sixteen articles were published in 2020 to 2023.

**Table 2.** Relevant article distribution in each period on each journal

Journal Name	Number of Articles			Total	%
	2012-2015	2016-2019	2020-2023		
Journal of Economics, Business, & Accountancy Ventura	-	1	-	1	4.54%
Jurnal Ekonomi dan Bisnis	-	-	1	1	4.54%
Media Riset Akuntansi, Auditing & Informasi	1	-	-	1	4.54%
Jurnal Akuntansi dan Auditing	-	1	2	3	13.70%
Jurnal Ilmiah Akuntansi dan Bisnis	-	-	2	2	9.10%
Jurnal ASET (Akuntansi Riset)	-	-	1	1	4.54%
Jurnal Dinamika Akuntansi	-	-	1	1	4.54%
Binus Business Review	-	-	1	1	4.54%
Performance: Jurnal Bisnis & Akuntansi	-	1	-	1	4.54%
Jurnal Riset Akuntansi dan Keuangan	-	-	2	2	9.10%
Krisna: Kumpulan Riset Akuntansi	-	1	-	1	4.54%
Jurnal Riset dan Aplikasi: Akuntansi dan Manajemen	-	1	-	1	4.54%
Shirkah: Journal of Economics and Business	-	-	1	1	4.54%
The Accounting Journal of Binaniaga	-	-	1	1	4.54%
International Business and Accounting Research Journal	-	-	1	1	4.54%
JIMEA Jurnal Ilmiah MEA (Manajemen, Ekonomi, dan Akuntansi)	-	-	1	1	4.54%
Owner: Riset & Jurnal Akuntansi	-	-	1	1	4.54%
JAKA (Jurnal Akuntansi, Keuangan, dan Auditing)	-	-	1	1	4.54%
Total	1	5	16	22	100%

The minimum publication of articles in the early period of this research was allegedly due to the topic being still in its early stages, considering that at that time, environmental issues were not as popular as they are today. Only in the last four years has interest in the topic of EMA started to emerge in reputable journals in Indonesia.

As for the eighteen journals, the journal that published the most relevant articles was the Jurnal Akuntansi dan Auditing, namely three articles or 13.70% of the total relevant articles. Followed by the Jurnal Ilmiah Akuntansi dan Bisnis and the Jurnal Riset Akuntansi dan Keuangan, each of which has two relevant articles (9.10%). The other journals only have one relevant article.

In line with initial estimates, it turns out that the topic of EMA has not been widely discussed in reputable journals in Indonesia. Considering that of a total of 329 journals in the economic area in Indonesia that are accredited from Sinta 1 to Sinta 5, there are only 18 journals that have articles discussing the topic of EMA.

### Article Classification

Referring to the research of Hoque (2014), selected articles are classified based on five categories, namely (a) the research topics, (b) the research settings, (c) the research theories, (d) the research methods, and (e) the primary data analysis techniques.

### The Research Topics

Table 3 shows the distribution of topics of the collected twenty-two articles, which classified into five topics. The first topic is “EMA implementation”, in which the article examines the extent to which EMA is implemented in general, with the majority of case studies in certain companies. The majority of these studies find the application of EMA in various aspects, such as environmental costing, environmental benefits, environmental performance measurement, environmental reporting and environmental disclosure. Furthermore, the second topic is a specific research on “environmental costing”, which examine how companies determine costs related to environmental aspects in their business. The third topic is a specific research on “environmental performance measurement”, which examine how companies use environmental-oriented performance measurement tools, in this case is the “sustainability balanced scorecard”. Next, the fourth topic is a specific research on “environmental disclosure”, which examine the factors that influence company decisions in carrying out environmental disclosure. Lastly or fifth is the topic of “EMA and firm performance”, which discusses how the application of various specific aspects of EMA can be one of the factors that influence company performance or value, from financial performance to sustainability.

**Table 3.** The research topics distribution in each period

EMA Topics	2012-2015	2016-2019	2020-2023	Total	%
EMA implementation	1	5	2	8	36.36%
Environmental costing	-	-	3	3	13.64%
Environmental performance measurement	-	-	3	3	13.64%
Environmental disclosure	-	-	1	1	4.55%
EMA and firm performance	-	-	7	7	31.81%
Total	1	5	16	22	100%

The only articles published in 2012 to 2015 examined “EMA implementation” (Suhartono & Frisko, 2013). Likewise, from 2016 to 2019, five articles also examined “EMA implementation” (Jayanti & Mutmainah, 2016; Sakdiyah, 2017; Irwan & Utama, 2018; Nainggolan et al., 2018; Indrawati & Rini, 2018). As for 2020-2023, the topics studied began to vary, with the previous topic “EMA implementation” was discussed in two articles (Prasetya, 2021; Kedisana et al., 2023), three articles each on “environmental costing” (Hidayah & Nianty, 2021; Hariwibowo, 2021; Safitri & Sari, 2022) and “environmental performance measurement” (Werastuti, 2021; Burhany et al., 2021; Pertiwi et al., 2021), “environmental disclosure” in one article (Maulana & Baroroh, 2022),

and the most popular topic is “EMA and firm performance” which was analyzed in seven articles during the latest period (Pratiwi et al., 2020; Mariyamah & Handayani, 2020; Rinsman & Prasetyo, 2020; Hapsoro & Adyaksana, 2020; Endiana & Suryandani, 2021; Sandamini & Dissanayake, 2022; Nengzih, 2022). This suggests that over time, the EMA-related topics covered in research are becoming more diverse and specific, and are increasingly being examined in conjunction with other variables.

The topic of “EMA implementation” as a whole is the earliest and at the same time the most widely discussed, namely in eight articles or 36.36%. Followed by the topics “EMA and firm performance” in seven articles (31.81%), “Environmental costing” and “Environmental performance measurement” each on three articles (13.64% each), and “Environmental disclosure” in one article (4.55%).

### The Research Settings

The research background used in this research is divided into several categories, namely manufacturing companies, non-financial companies, hospitals, universities, sugar companies, textile companies, textile companies, oil and gas companies, cement companies, others, and no setting. For “others”, the articles didn't specify a company or organization, but instead they took samples from individuals, ie managers and accounting students.

Table 4 summarizes the settings used in the study. One article published in 2012 to 2015 takes setting at a university (Suhartono & Frisko, 2013). Furthermore, from 2016 to 2019, two articles have a setting in a hospital (Sakdiyah, 2017; Indrawati & Rini, 2018), and one article each takes a setting in a sugar company (Nainggolan et al., 2018), oil and gas company (Irwan & Utama, 2018), and others (managers) (Jayanti & Mutmainah, 2016). Then from 2020 to 2023, there are six articles with setting in manufacturing companies (Mariyamah & Handayani, 2020; Hapsoro & Adyaksana, 2020; Endiana & Suryandani, 2021; Sandamini & Dissanayake, 2022; Nengzih, 2022), three articles in nonfinancial companies (Pratiwi et al., 2020; Rinsman & Prasetyo, 2020; Maulana & Baroroh, 2022), two articles each in textile companies (Safitri & Sari, 2022; Kedisian et al., 2023), one article each in university (Pertiwi et al., 2021), sugar company (Hariwibowo, 2021), cement company (Hidayah & Nianty, 2021), and others (accounting students) (Werastuti, 2021). Meanwhile one article didn't use any setting because the research was focused on a literature review (Prasetya, 2021).

**Tabel 4.** The research settings distribution on each period

Settings	2012-2015	2016-2019	2020-2023	Total	%
Manufacturing companies	-	-	6	6	27.28%
Nonfinancial companies	-	-	3	3	13.65%
Hospital	-	2	-	2	9.09%
University	1	-	1	2	9.09%
Sugar company	-	1	1	2	9.09%
Textile companies	-	-	2	2	9.09%
Oil and gas company	-	1	-	1	4.54%
Cement company	-	-	1	1	4.54%
Others	-	1	1	2	9.09%
No setting	-	-	1	1	4.54%
Total	1	5	16	22	100%

Overall, manufacturing companies show dominance because they are used as the setting in six articles (27.28%), followed by nonfinancial companies which are used in three articles (13.65%). Furthermore, hospitals, universities, sugar companies, and textile companies are used as the research setting in two articles each (9.09% each). Next, oil and the company as well as the cement company are used in one article each (4.54%)

each). Then, there is one article (4.54%) that didn't use any setting because they only use literature review methods, and two articles (9.90%) are categorized as using "others" because they use individuals (managers and accounting students, respectively) as their research samples.

### The Research Theories

In conducting their research, there are several theories used by authors of articles on EMA topics in Indonesia. Of the twenty-two articles, fifteen articles mentioned the theory used, while seven articles did not specifically mention theory. Theories used in these articles include legitimacy theory, stakeholder theory, institutional theory, signaling theory, theory of planned behavior, contingency theory, and positive accounting theory. Some articles use multiple theory. The frequency distribution related to the theory used can be seen in Table 5 below.

**Table 5.** The research theory distribution in each period

Theory	2012-2015	2016-2019	2020-2023	Total	%
Legitimacy theory	-	-	2	2	9.09%
Stakeholder theory	-	-	2	2	9.09%
Signaling theory	-	-	1	1	4.54%
Theory of planned behavior	-	-	1	1	4.54%
Institutional theory	-	-	1	1	4.54%
Positive accounting theory	-	1	-	1	4.54%
Multiple theories	-	2	5	7	31.81%
No theory	1	2	4	7	31.81%
Total	1	5	16	22	100%

Table 6 below shows an overview of the use of each type of theory in these articles. In other words, multiple theories are broken down into each theory, so that it can be assessed and counted individually.

**Tabel 6.** The research theory used in total

Theory	2012-2015	2016-2019	2020-2023	Total	% from 22 article
Legitimacy theory	-	1	6	7	31.81%
Stakeholder theory	-	1	5	6	27.27%
Institutional theory	-	1	2	3	13.64%
Signaling theory	-	-	2	2	9.09%
Theory of planned behavior	-	-	2	2	9.09%
Agency theory	-	-	1	1	4.54%
Contingency theory	-	1	-	1	4.54%
Social capital theory	-	-	1	1	4.54%
Positive accounting theory	-	1	-	1	4.54%
No theory	1	2	4	7	31.81%
Total	1	7	23	31	

Based on table 6 above, it can be seen that the theory most widely used in EMA research in Indonesia is "legitimacy theory", which is used in seven articles or 31.81% of the total twenty-two articles examined in this study (Irwan & Utama, 2018; Mariyamah & Handayani, 2020; Rinsman & Prasetyo, 2020; Pertiwi et al., 2021; Nengzih, 2022; Maulana & Baroroh, 2022; Kedisana et al., 2023). Legitimacy theory is often become the basis for

environmental disclosures or activities in business (Nengzih, 2022). Focusing on the interaction between companies and the environment, legitimacy theory proposes that companies continue to make sure that their activities are done in accordance with societal boundaries and norms (Deegan et al., 2002).

The second most widely used theory is “stakeholder theory” which is used in six articles or 27.27% of the total articles (Irwan & Utama, 2018; Pratiwi et al., 2020; Mariyamah & Handayani, 2020; Werastuti, 2021; Burhany et al., 2021; Pertiwi et al., 2021). According to this theory, managers have an incentive to disclose specific information to stakeholders (Freeman, 1984), one of those stakeholders is environmental and social groups.

In addition, other theories used are “institutional theory” which is used in three articles (13.64%), then “signaling theory” and “theory of planned behavior” which are used in two articles each (9.09% each). The other theories is used in one article (4.54% each), i.e. “agency theory”, “contingency theory”, “social capital theory”, and “positive accounting theory”. From the analysis, which reflected in table 6 above it can also be seen that the diversity of theories used in research is getting higher over time, meaning that more and more recent articles accommodate existing theories.

### The Research Methods

Of the various existing methods, the methods used in the twenty-two selected articles were quite diverse, namely archival, interview, observation, survey, and experiment. To simplify classification, the use of archival research and secondary data research methods is equated in this study as an archival method, in which researchers analyze archival or secondary data to obtain certain information relevant to the topic.

Several articles (Suhartono & Frisko, 2013; Irwan & Utama 2018; Hidayah & Nianty, 2021; Hariwibowo, 2021; Safitri & Sari, 2022) uses the triangulation method, which specifically consists of archive, interview, and observation methods. This method is used to avoid bias on information which is used as a reference for data analysis (Hidayah & Nianty, 2021). In addition, there are also articles that use a combination of two methods, hereinafter referred to as multiple methods.

**Table 7.** The research methods distribution on each period

Research Methods	2012-2015	2016-2019	2020-2023	Total	%
Archival	-	-	8	8	36.36%
Interview	-	-	2	2	9.09%
Survey	-	1	1	2	4.54%
Experiment	-	-	1	1	4.54%
Triangulation	1	1	3	5	13.64%
Multiple methods	-	3	1	4	4.54%
Total	1	5	16	22	100%

Table 7 summarizes the frequency distribution of the research methods in the twenty-two selected articles. From 2012 to 2015, there was one article using the triangulation method (Suhartono & Frisko, 2013), then from 2016 to 2019 there was one article each using the survey method (Jayanti & Mutmainah, 2016) and the triangulation method (Irwan & Utama, 2018), while three articles used multiple methods or used a combination of two different methods (Sakdiyah, 2017; Nainggolan et al., 2018; Indrawati, 2018). As for 2020 to 2023, along with the increase in research on the topic of EMA, it can be seen that the methods used in the research are also increasingly diverse, where there are eight articles using the archival method (Pratiwi et al., 2020; Mariyamah & Handayani, 2020; Rinsman & Prasetyo, 2020; Hapsoro & Adyaksana, 2020; Endiana & Suryandani, 2021; Prasetya, 2021; Nengzih, 2022; Maulana & Baroroh, 2022), three articles using triangulation method (Hidayah & Nianty, 2021);



Hariwibowo, 2021; Safitri & Sari, 2022), two articles using interviews (Pertwi et al., 2021; Sandamini & Dissanayake, 2022), and one article each using survey method (Kedisan et al., 2023), experiment method (Werastuti, 2021), and multiple methods (Burhany et al., 2021).

Considering that there are several articles that use triangulation and multiple methods, Table 8 is compiled below to break down the methods. Thus, the use of the method in the twenty-two articles can be known individually.

**Table 8.** The research methods used in total

Research Methods	2012-2015	2016-2019	2020-2023	Total	% of 22 articles
Archival	1	3	11	15	68.18%
Interview	1	4	6	11	50.00%
Observation	1	2	3	6	27.27%
Survey	-	1	2	3	13.64%
Experiment	-	-	1	1	4.54%
Total	3	10	23	36	

Based on table 8 above, it can be seen that the most dominant method used in research on EMA topics in Indonesia is the archival method, which is used in fifteen out of twenty-two articles (68.18%). Followed by the interview method, which is used in eleven articles (50%), the observation method used in six articles (27.27%), the survey method used in three articles (13.64%), and the experiment method used in one article (4.54%).

### The Primary Data Analysis Techniques

Table 9 shows the frequency distribution of the primary data analysis techniques used in the twenty-two selected articles. Hoque (2014) divides the analytical techniques into qualitative, quantitative and mixed. Techniques included in qualitative, for example, are interview analysis, content analysis, archival analysis, and observation. Quantitative techniques include regression, ANOVA, MANOVA, descriptive statistics and correlation. While examples of mixed techniques are Structural Equation Modeling (SEM) and path analysis.

These three types of techniques are all covered in the twenty-two articles on the topic of EMA in this study. The qualitative techniques is content analysis, then for quantitative techniques include regression and quantitative descriptive analysis. The regression techniques used include panel data regression analysis, moderated regression analysis, and multiple linear regression analysis. The mixed technique used is SEM, specifically the Partial Least Square (PLS) type (SEM-PLS).

Content analysis is a research technique for making replicable and valid inferences from data according to their content, including in accounting research to code environmental narratives on annual reports (Hoque et al., 2017). In this research, content to analyze are interview results, observation results, reports, and other documents. Meanwhile, regression analysis is used to predict the value of a dependent variable based upon one or more independent variables (Greener & Martelli, 2018). Quantitative descriptive analysis intends to describe data by converting it to a quantitative measure, which is used in this study in the article by Burhany et al. (2021) who analyzed survey and interview data quantitatively.

Meanwhile, SEM is a mixed-method that tests conceptual or theoretical models, which combines measurement models and structural models. SEM is used to analyze latent variables that cannot be measured directly, and SEM of the Partial Least Square (PLS) type is used to make predictions or develop theories (Hair et al. 2011).

**Table 9.** The data analysis technique distribution on each period

Analysis Technique	2012-2015	2016-2019	2020-2023	Total	%
Content analysis	1	4	6	11	50.00%
Regresi	-	-	6	6	27.27%
Quantitative-Descriptive analysis	-	-	1	1	4.54%
SEM-PLS	-	1	3	4	18.18%
Total	1	5	16	22	100%

Based on table 9, it can be seen that one article from 2012 to 2015 used an analytical technique in the form of content analysis (Suhartono, 2013). Then from 2016 to 2019, four articles used content analysis (Sakdiyah, 2017; Irwan & Utama, 2018; Nainggolan et al., 2018; Indrawati, 2018) and one article used SEM-PLS (Jayanti & Mutmainah, 2017). Furthermore, in the period from 2020 to 2023, content analysis techniques (Hidayah & Nianty, 2021; Hariwibowo, 2021; Pertiwi et al., 2021; Prasetya, 2021; Sandamini & Dissanayake, 2022; Safitri & Sari, 2022) and regression (Pratiwi et al., 2020; Mariyamah & Handayani, 2020; Werastuti, 2021; Nengzih, 2022; Maulana & Baroroh, 2022; Kedisan et al., 2023) were used respectively in six articles, the SEM-PLS technique in three articles (Rinsman & Prasetyo, 2020; Hapsoro & Adyaksana, 2020; Endiana & Suryandani, 2021), and quantitative descriptive analysis in one article (Burhany et al., 2021).

Thus, overall, content analysis is the most widely used technique, namely in eleven articles or 50%. Followed by the regression technique used in six articles (27.27%), SEM-PLS in four articles (18.18%), and quantitative descriptive analysis in one article (4.54%).

## CONCLUSION

This article aims to analyze the current status of research on Environmental Management Accounting (EMA) in Indonesia. A search in a total of 329 SINTA accredited journals in economics yielded twenty-two relevant articles, published in eighteen different journals, ranging from those accredited as Sinta 2 to Sinta 5. The oldest article published was in 2013 (Suhartono & Friska, 2013) and the latest article was published in 2023 (Kedisan et al., 2023).

The twenty-two articles were analyzed using five categories from Hoque (2014). First, regarding "the research topics", the topic that was most widely discussed was the "EMA implementation" topic which was widely discussed in the early periods, as well as the topic "EMA and firm performance" which was increasingly discussed in the recent period. Regarding "the research settings", relevant articles are dominated by research in manufacturing companies and nonfinancial companies. Regarding "the research theories", the theory most used as a basis is the legitimacy theory and stakeholder theory, with quite a number of articles that do not write down the theory on which the research is based. As for "the research method", the archival method, which includes review of archives and secondary data, is the most widely used method for research related to EMA, followed by the interview method. Some researchers also choose the triangulation method to obtain the data. Finally, regarding "the primary data analysis techniques", the majority of articles use content analysis, followed by the use of regression or SEM-PLS, to draw conclusions from the data obtained.

Based on the trends obtained from the analysis of these articles, there is several opportunities for future research. First, researchers can try to explore new topics by associating various aspects of EMA with other variables, considering that the majority of existing research in Indonesia only examines the implementation of EMA in certain companies or only relates it to firm value or performance variables. Second, none of the previous articles that were the findings of this study examined EMA specifically in financial companies, hence future

researchers can try to see whether the results of implementing EMA in financial companies are consistent with EMA implementation in non-financial companies. Third, researchers can try to examine EMA based on theories that have not been used, to see from a different perspective and relate it to new and unique variables. Fourth, given the large number of studies that use different analytical methods and techniques, future researchers can analyze using new methods or techniques, and can also analyze whether the use of different methods can lead to different conclusions, for example through literature reviews from various Indonesian and foreign journals.

Through this study, it was discovered that there has been relatively little research done on EMA in Indonesia. In order to improve the literature in Indonesia on EMA, it is intended that academics and researchers would become more motivated to study EMA and will get insight into potential research subjects. It is hoped that this research will contribute to an increase in EMA research, which will in turn raise practitioners' knowledge of the value of implementing EMA in their organization.

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