

A SYSTEMATIC REVIEW ON ENVIRONMENTAL ACCOUNTING

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ABSTRACT

***Purpose** –The purpose of this study is to investigate Environmental Accounting and its importance. The systematic review of academic and professional literature depicts that EA is very useful and significant in controlling entities that are operating in environmentally sensitive industries. The research papers that relating to the EA, which are available in Emerald, Taylor and Francis, and also Oxford journal, were used for this systematic review. The probability of published reports is a little bit unclear. The commitments of the companies towards sharing the environmental cost are not disclosed. For better recognition and charging of environmental-related costs, this system is necessary. So EA system provides a significant road map for internal and external auditors in their achievements as well as assists the entities in enhancing performance. There are many policy implications from both national and international levels. The paper commits for improving knowledge relating to the EA in many ways. And the ideas present in this paper are original.*

Keywords: Environmental Accounting, Financial Reporting, Environmental Costs.

INTRODUCTION

Environmental Accounting (EA) has become a novel branch of accounting science with the formation of the concept of sustainable development of human society since the 1970s. EA coming under the category of accounting since the early 1970s as a tool of reflecting and supervising economic activities related to the environment. This is depicted through research on the conversion of social costs in controlling pollution and also a paper on accounting problems of pollution which has started the prelude of the EA research (Zhu Xueyi, 1999). EA got more concern in the United Nations (UN) conference on Environment and Development in 1992 as well as the report of UN World Environment and Development Committee in 1987 with the title "Our Common Future." Since then, the researchers have carried out many types of research and discussions on EA. The research by Rob Gray in 1990 on "Green Accounting: The Accounting Profession after Pearce" is identified as a milestone on EA. It indicated that EA researches have become the main subject area under discussion in the global academic circles. The characteristic of EA is "accounting about increase or decrease on artificial assets and natural assets, most importantly accounting of conversion between the two assets" (Grey, 1990), which means it mainly studies and reveals artificial assets, natural assets, and transformation betwixt these assets.

There are two different kinds of views on EA definition. EA is playing the role of "book noting" is one of the views on EA. For example, it can take the argument of Peskin et al. (2001). They argued that EA preparation over traditional measures of economic performances such as gross domestic product (GDP), net domestic products (NDP), etc. For making the measurement methods to reflect the environmental changes in a better way.

Management functions of EA emphasize the other view. For example, EA is to verify, disseminate and analyze material flows via the usage of EA management system, which makes managers to identify the environmental and pecuniary influence on the enterprises according to the consideration (Steele & Powell, 2002).

The researchers try to form innovation theory and investigation of EA from various perspectives with the development of EA research. Thus, the comprehension over EA has further extended. The EA is not restricted only to enterprise accounting (Gray & Bebbington, 2001). The features such as transparency, reliability, verifiability, auditability etc. should be there in EA (Hines, 1988). This concept was expanded by Solomon & Thomson (2009), keeping that EA is a system that provides information inflows and outflows for various organizations. Natural, economic, ethical, and cultural resources are combines for measuring the environmental efficiency and social efficiency of various firms.

The studies on EA theory in recent years have developed the theoretical basis on this as well as necessary technologies and methods of EA, and carried out investigations from various perspectives according to the latest research literature.

Many large-scale corporations such as Formosa, British Petroleum Corporation, and Volkswagen's largest automobile manufacturing groups have collapsed because of the information disclosure frauds relating to EA (Nguyen, 2019). It is a warning for business organizations to enhance the awareness of environmental protection. There has been a developing consideration about the accountability of organizations to report environmental information in recent years. For the performance and reputation, the companies are anticipated to reveal information relating to EA in their reports. The organization's pressure for reporting accountability comes due to the request from investors and consumers as well as directives from European Union (EU) (Spasic & Stojanovic, 2013).

Recent investigations on EA are gaining great consideration from researchers around the world due to the significance of practicing and publishing EA information. Those investigations have explained that environmental performance has the ability to improve stakeholders' satisfaction, improves the brand image and also improves the firm value, and reducing the cost of capital. The organizations with a higher earlier history of positive environmental performance had very little risk for bankruptcy (Lin & Dong, 2018). The organizations with better environmental performance have a low risk and prove that corporate environmental performance is favorably related to organization's value (Cai et al., 2016; Fuadah et al., 2019). Environmental performance can be considered as a way in venture processes with strong associations with different stakeholders (Oikonomou et al., 2014). According to Yeh et al. (2019) Chinese firms reduce their cost of debt capital due to higher environmental responsibility. It will make a great commitment in decreasing organizations' equity financing costs when making investments in enhancing environmental responsibility performance (Xu et al., 2015). The organizations with best environmental responsibility performance have lower capital restrictions (Salvi et al., 2018).

According to Oikonomou et al. (2014); Salvi et al. (2018), environmental responsibility performance strength can reduce the cost of equity capital. Further, Cost of debt capital can be reduced according to Jha and Cox (2015), and also credit dissemination will decrease due to strong environmental responsibility performance (Ghoul et al., 2011). The extent of disclosing EA details positively impacts the financial performance of business organizations at present and in the future (Nguyen & Tran, 2019). The study by Nguyen (2019) examined that there is a close association between the degree of environmental, financial accounting practices (EFAP) and current year corporal financial risk and subsequent years. There is an increasing trend of the extent of disclosing EA information (Nguyen, 2019; Nguyen et al., 2017). Anyhow, the extent of disclosing environmental information did not meet stakeholders' demands as expected. An empirical investigation between EFAP and cost of capital in developing economies context is restricted even though there are many studies on EFAP. Therefore, this systematic literature review was carried out with the objective of enhancing awareness about the significance of EA practices.

METHODOLOGY

The current literature on the EA focuses on researching related academic papers instead of devising new theories. For this reason, we have decided to use a systematic review strategy to identify and coordinate the current information for analysis. This methodology builds on research that draws on academic and primary sources by studying observational studies and peer-reviewed journal papers. This research aims to produce a literature review and only legitimate journals used for its source.

This article is based on the preferred reporting items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines of (Moher et al., 2009). Describe this guideline, including the two steps: systematic literature review and content analysis briefly. Specific methods which this study follows is presented in section 2.1 by following the cited protocols. The study presented a content analysis to recognize and for the organization of qualitative data from the literature for a better comprehension of EA.

Systematic Literature Review

The term used to find the literature was EA and used Emerald, Oxford, and Taylor and Francis journals to find the literature. These journals were used as they are large search systems that employ multiple databases. The database was covered the period between 2000-2020. In order to narrow the results to those published during the period, the date range was used. The research used only peer-reviewed journal articles published in English. By using the same search terms in Google, search engines were browsed by using the key terms to the study: "Environmental Accounting", "Social and Environmental Accounting", "Determinant of Environmental Accounting," and combinations of these terms and other individual terms. These search methods recognized 1127 records in total research articles. Redundant studies were removed from the review, and further, Some articles were applied the same framework, then those articles were excluded to prevent double counting. PRISMA flow diagram of the literature search and the review is presented as follows.

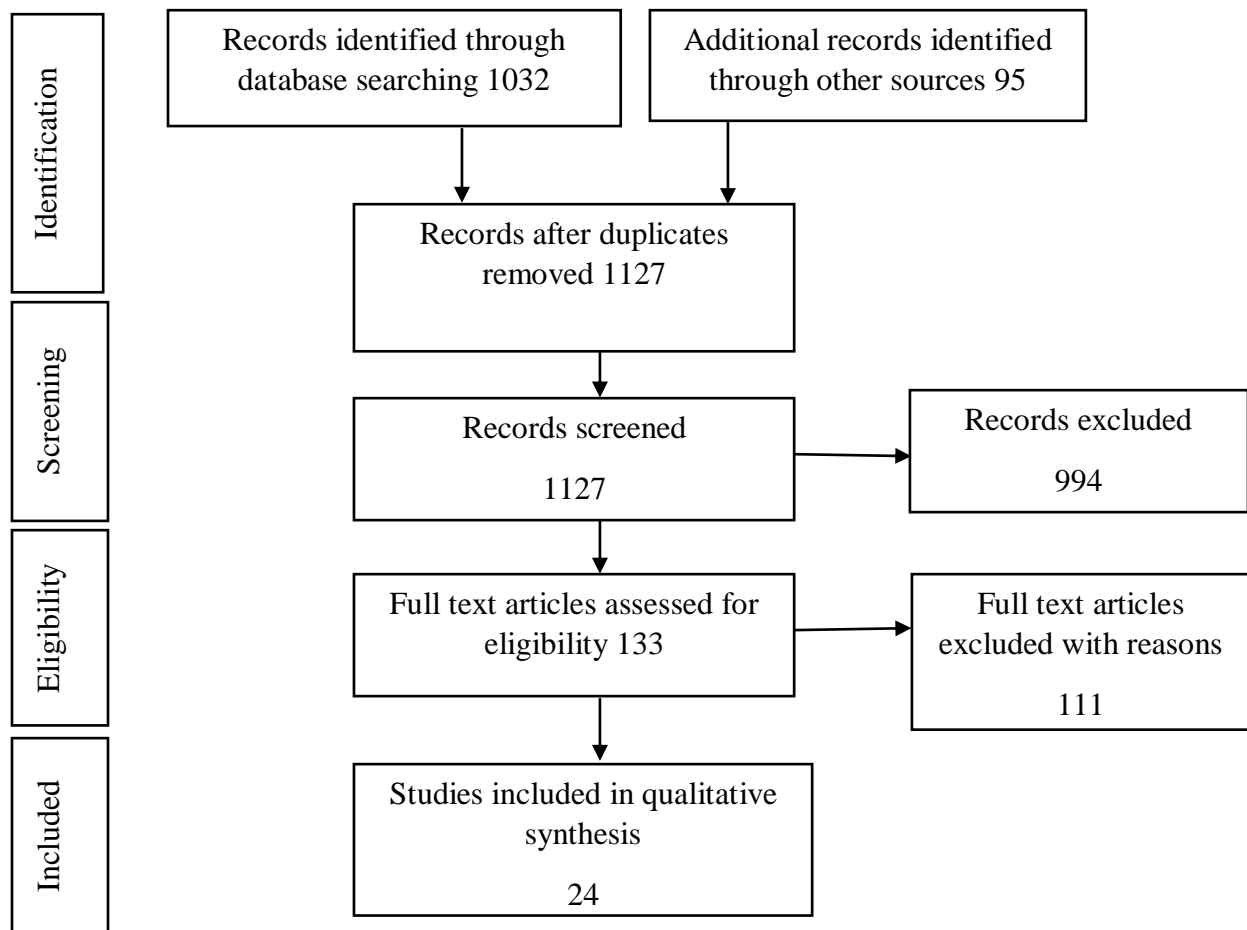


FIGURE 1
PRISMA FLOW DIAGRAM OF LITERATURE SEARCH AND REVIEW

Content Analysis

24 sources were chosen for the investigation, and each source was read in full for qualitative content analysis. Information relating to EA was recorded in a spreadsheet. It was organized into categories as title, author and year, and journal name. The information recognized from the literature was added to cells under the categories as identified by the researchers.

RESULTS AND DISCUSSION

The articles included in this study which were searched in Emerald and Taylor and Francis, are presents in table 1. The table lists a title and reference of the research for each article.

Table 1	
THEMATIC INFORMATION ON EA	
Title	Reference/ Source
"Environmental cost accounting and auditing."	Letmathe, and Doost, (2000)
"The role of EA in organizational change An exploration of Spanish companies."	Carlos et al.,(2001)
"Product quality, EA and quality performance."	Dunk, (2002)
"EA and change in UK local government"	Ball, (2005)
"Social and environmental accountability research A view from the commentary box."	Parker,(2005)
"Sustainable development and EA: the challenge to the economics and accounting profession"	Herath, (2005)
"National EA: A Practical Introduction"	Hecht (2016)
"Accounting for The Effect of Health On Economic Growth"	Nathan (2005)
"WHO's Doing EA? A Survey of NSW Dairy Farms"	Harrison and Lamberton, (2007)
"Chronicles of wasted time? A personal reflection on the current state of, and future prospects for, social and EA research"	Owen,(2008)
"Determinants of EA practices in local entities: evidence from Portugal."	Ribeiro and Guzman, (2010)
"Perceptions of corporate social and EA and reporting practices from accountants in Bangladesh."	Islam and Dellaportas, (2011)
"Social and EA and Accountability"	Van Staden et al., (2011)
"IFRS and EA"	Negash, (2012)
"How does EA information influence attention and investment?"	Alewine and Stone, (2013)
"Determinants of EA and reporting practices in Portuguese local entities"	Ribeiro, & Guzman, (2010).
"Audit committees and financial reporting quality Evidence from UK EA disclosures"	Al-Shaer, Salama, and Toms, (2017)
"Economic analysis of using green accounting and EA to identify environmental costs and sustainability indicators"	Rounaghi ,(2019)
"Trends in EA research within and outside of the accounting discipline"	Marrone et al., (2020)
"The limits of EA disclosure: enforcement of regulations, standards, and interpretative strategies."	Senn and Giordano-Spring, (2020)
"Designing the model of factors affecting in the implementation of social and environmental Accounting with the ISM approach."	Tooranloo and Shahamabad, (2020)
"Integrating financial, social and EA"	Nicholls, (2020)
"Dynamic capabilities and EA for the circular economy in businesses."	Scarpellini et al ., (2020)
"EA practices and cost of capital of enterprises in Vietnam."	Nguyen Huu Anh et al., (2020)

The research paper by Negash (2012) examined whether IFRSs can be utilized in environmental degradation monitoring. Hence, according to the literature, IFRS gives a very significant conceptual framework in administering the entities which are functioning in environmentally sensitive industries. The researcher used qualitative and case study methods, and the financial statements of three companies that are environmentally sensitive were studied. The findings reveal that the reports created by the companies compromising both information and propaganda. And there was an unclarity of the credibility of published reports. As well the

cost for decommissioning, rehabilitation, and restoration of the environment have not been disclosed.

Letmathe, and Doost, (2000) stated that In making a decision on environmental effects, a cost accounting scheme could be turned on its head. So that decisions will affect the flow and not the other way around. It employs cause-and-effect analyses to estimate the expense of the environmental impacts. The research uses an EA scheme to explain both internal and external audits. And if goals and benchmarks are met, the knowledge helps in judging success. Indisputably, there is a high degree of processing inefficiencies in the environment. Removing them would help the firm meet its environmental and financial targets.

Carlos et al. (2001) showed that Theory developed earlier on the importance of "sustainable enterprise" created EA as a concept to attract attention and used it to research business transformation. They concluded that EA has been misreporting prevalent in corporations that have not substantially altered their impact on the environment. They have applied Gray et al. model's and findings to diverse cultures. While there are changes in Spain's social and organizational structures, they were unable to observe an inversion of traditional views of the world at work."

Hecht (2016) stated that environmental issues have been high on the public agenda for many years. As far back as the 1970s, several European countries were still doing environmental experiments, and in the late 1980s, the UN and other foreign organizations followed suit with similar efforts. This was followed by the release of an interim accounting handbook in 1993, and then the release of a more thorough accounting guide in 2003.

Herath, (2005) studied to determine whether or not natural resources serve as a positive influence on sustainable development. Resource accounting is relevant because GDP does not only provides short-term measures of a country's health. It identifies the current status, the limits, as well as the possibilities for the design and accounting careers. A key shortcoming of GDP as a growth metric is that it fails to account for environmental impact. Improvement is complicated by the measurement of environmental harm, however, and in order to get a better concept, it includes including the use of natural resources. The obstacle to the economics and accounting profession is to consider the world clearly, to have accurate assessment methods, and to accommodate different groups'. The new ideas presented in this paper which blend various concepts and creative skills to chart an innovative course for EA.

In macroeconomic terms, Nathan (2005) stated that the researcher used microeconomic estimates of the impact of health on personal outcomes to calculate its macroeconomic effects on an individual. The different methodologies used to produce various estimates for height, age at menarche, and adult mortality are drawn from research in the country and cross-nation studies. The finding is economically significant, and it is also substantially smaller than estimates of the effect of health on economic growth that are derived from cross-country regressions.

The study by Letmathe and Doost (2000) concludes that an environmental cost accounting system that is based on a cause-and-effect association is necessary. It is very important for better recognition and proper charging of costs relating to the environment. Further, they concluded that improvements achieved due to the creation of an efficient environmental cost accounting could assist the entity in achieving its goals.

GDP is a measure of development, and it does not take damages to environmental resources. So, it is the main weakness of GDP (Gamini, 2005). According to Gamini (2005), it is difficult to measure environmental damages. So, the development of the concept to include environmental resources is made difficult. Larrinaga et al. (2001) studied the association between

EA and organizational change in Spanish context using Gray et al.'s model. So, the researchers used nine companies in various industries with a variety of views on EA in Spain. Six companies out of nine companies were replied to a previous postal questionnaire. Then again, another three companies were added to provide a complete view of various industries. Larrinaga et al. (2001) revealed that Spanish organizations were not changing their traditional view of the environment as well as the usage of EA is doubled with an effort to discuss and monitor the environmental agenda.

Execution of EA and product quality are significant facts in improving quality performance (Dunk, 2002). The researcher focused on determining quality performance considering both product quality and EA. The researcher used three variables such as product quality, EA, and quality performance. For the purpose of the study, a random sample of 119 functional area executives was used in Australian manufacturing companies listed in *Kompas Australia* (1995). EA can be said to also to add to the efficiency of operations. So long as environmental concerns are given the same consideration as economic, the higher the company will be, the overall results. If product quality and EA have an impact on efficiency, then it does go hand in hand with the implementation or has the opposite effect.

The research paper by Ball (2005) explores EA in terms of sustainable development. The researcher used a case study of how a UK local state council is responding to an environmental agenda in terms of an array of gradual political, functional, and community pressures to change its activities. The researcher reveals that loosen EA is pressed in to use for promoting such changes.

Parker (2005) also performed an investigation in social and EA. The investigation used two major prior seminal papers on this area. It investigates the remit for SEA researches concentrated on policies and practices. It offers an empirical analysis of social and EA publications. Parker (2005) recognized theories in two groups. They are augmentation and heartland theories. The findings revealed that environmental researches dominate more recent publications on SEA. Literature-based theorizing, national practices, comparisons, and regulations are the most prominent methodological approaches. The study by Owen (2008) presented a critical review on the development and current state of social and EA using the reference from *Accounting, Auditing and Accountability Journal*.

Ribeiro and Guzman,(2010) investigated the degree of execution of EA practices in local Portuguese entities. Data were collected using a questionnaire which was posted to medium-sized and large city councils and also sent to the municipal companies. The findings revealed that the extent of development of EA practices of local entities in Portugal is low. And also, the prevailing compulsory EA standards are not positively associated with developing EA practices by domestic entities in Portugal.

Islam and Dellaportas (2011) carried out a study with the purpose of eliciting the view of accountants regarding corporate social and EA and reporting practices in a developing country like Bangladesh. Members of the Institute of Chartered Accountants of Bangladesh (IACB) were surveyed to determine views on problems pertaining to social and EA and reporting practices in Bangladesh. The findings revealed that accountants have positive attitudes towards social and EA, and the progress is limited.

Alewine and Stone (2013) conducted a study on "How does EA information influence attention and investment?" and stated that Strategic choices are now closely linked to environmental issues because of their implications. The results integrate environmental data into a sustainability scorecard, which is known as the biodiversity balanced scorecard. They

suggested that, however, as data on the atmosphere was introduced, the process of allocating attention shifted, which led to changes in environmental data usage; thus, the type of EA data matters, too. The study is one of the first to demonstrate how expenditure and attention vary through the existence and accessibility of environmental evidence.

Ribeiro, and Guzman, (2010) underlined to analyze the local organizations' use of EA practices. A series of questionnaires were sent to medium and large and small cities and other local governments, regional, district, and regional government entities. Three variables were taken into account into the study of EA practices in the public sector growth of accounting. Environment accounting processes in Portuguese institutions are undeveloped in the company size and environmental maturity to both need and ability. Hence, the results showed that there was no relationship between implementing compulsory environmental requirements and the establishment of EA practices in the country. The research focuses on Portugal, which is now going through a period on increased regulations of environmental disclosure. This will help local regulators understand the EA and monitoring processes currently in place in Portugal and provide a framework for developing more appropriate environmental controls. This paper filled this void in the existing body of EA literature by including a summary of the methods used by Portuguese city halls and other local government organizations.

Al-Shaer, et al. (2017) aimed to investigate the factors that affect the number of environmental disclosures. If the size of a firm's stockholders was increased, the number of filings is not impacted. This is more confirmation to show the findings can be valid in other countries. The incongruent signification Narrative accounting regulations related to environmental problems are eased by creative solutions. Corporate governance systems, primarily audit committees, have studied the connection between environmental narratives and financial reporting using volunteer information.

Rounaghi (2019) showed that environmental management is a significant criterion for evaluating a company's performance for businesses to work together as a team of chemical engineers, plant managers, staff, and buying agents. Almost all businesses are finding ways to deal with the climate and report on it. Today's human world faces one of the most serious environmental issues. For this purpose, EA is important. The finding showed that green accounting seeks to include environmental charges in the financial activities other than addressing the question if the economy performed during a given time, GDP can also be useful in economic policymaking and/ as a measure of progress. Accounting for the environment is important in all industry sectors, no matter the size. Big or small, depending on the situation, EA may be used. It is essential to collect data from all organizational subunits. People who belong to different interest groups need to speak to each other to reach a shared environmental goal. Clearly, accountants will have a perfect foundation for economic and financial regulations. In order to accomplish this purpose, EA goals and activities should be specified thoroughly, the guidelines and regulations should be defined based on practical concepts.

In their research, Marrone, et al. (2020) examined to show topics and concepts as they appear using a machine learning approach for literature reviews. It has been found that articles on corporate social responsibility (CSR) and stakeholder theory have proliferated within accounting journals in the last few years. These might not be reliable sources of information (e.g., accounting for ecosystem services). It offers a tool for defining "trending" subjects in accounting and non-accounting publications. The authors do a much-needed analysis on EA.

From a different point of view, Senn, and Giordano-Spring, (2020) studied to get information into the world of company EA disclosure, which is not much done previously. The analysis takes advantage of a system based on normativity. Their research is focused on annual reports. And further, Semi-structured interviews with 20 senior employees at these same companies offer interpretative interpretations of the statistics. Their results suggested that EA (EA) is still in its infancy. The low level of regulatory clarity allows for varying interpretations of evidence to be applied in the financial reporting of certain organizations. They have concluded that environmental spending and responsibility will exist independently, and regulators would find this analysis very beneficial when environmental rules are subject to modification, as well as useful for consumers. The study contributes to the body of research on the matter. To better understand how various actors and networks approach regulatory policies that contributes to EA norms.

In increased research, interest exists with respect to the EA, Tooranloo and Shahamabad, (2020) focused solely on the economy, and financial problems have had little effect on improving society but caused increased damage. However, proper accounting will offset the damage, as well as boost environmental concerns. For that purpose, social and EA continues to expand and evolve as time goes by. According to emerging theories and expert views, seven areas were identified as key factors affecting social and EA implementation: respectively, financial accounting standards, environmental justice, environmental accountability, corporate challenges, environmental regulation, financial compliance, resource protection, and risk mitigation, and legal responsibilities. The two methodologies employed in their study employed structural modeling and MICMAC techniques to analyze the relationships. The findings showed that legal obligation is one of the causal factors. However, the majority of the characteristics are governed by statutory and regulatory standards. As a result, it is necessary to pay serious attention to legal standards in order to get the social and EA to work. This also places a premium on enhanced environmental sustainability because the climate plays a unique role in societies' sustainable growth. To circumvent social and environmental costs and losses, the implementation of the social and EA model was created in their study. It seems that including all established variables will lead to big gains in terms of strengthening and increasing social and EA. This is the first to provide a consistent and robust implementation model for social and EA.

Nicholls, (2020) examined financial reporting from its nineteenth-century origins in the light of a better understanding of policy, individual preferences, and how the market operates on a global scale. Many methods of using combining financial and social information use is correct; these two categories of data sit opposite each other. Both the positive and negative aspects of the new approaches to evaluating social and environmental performance are left unexamined. Changing this strategy would entail a consensus among wealth managers, population, civil society, and legislative members, as well as a strategy for exiting the current approach. Considering social consequences, this could be the foundation for any number of valuable research projects that might help policymakers formulate capital allocations that take environmental and social ramifications into consideration into account. There are many ways to integrate social and financial accounting; however, by aligning the public policy with investor interest, we can solve several of the problems that come from any of those methods.

According to Harrison and Lamberton, (2007), previously, Australian farmers were found to be much less open to environmental accounting with low levels of self-sufficiency. This paper explores the findings of a survey of 204 NSW dairy farmers who failed to find financial professionals, which concludes that most farmers produce environmental accounting without

consulting with accountants, a crucial partner. According to the study, people who join discussion groups that focus on environmental issues are more likely to seek out and accumulate knowledge on the topics of environmental accounting. Studies revealed no direct correlation between the level of education, the nature of business training, or farm size and the degree of environmental accounting.

Nguyen Huu Anh et al., (2020) examined to investigate the nexus between the level of environmental, financial accounting practices (EFAP) and the cost of capital. In this study, there were 1288 long-year data observations. However, 73 firms could not do adequate financial analysis due to the lack of such data, and 35 firms did not have ample data to measure the financial return on capital. Finally, the report used a subset of 672 firm-year findings from 2013 to 2017 firms from the country's stock exchange listings for analysis for five years. Econometric problems and improved coefficients of regression are resolved by using two-stage regression with the lag. Firms with better EFAP outcomes reduced their cost of capital over time. The study concluded that the relationship between EFAP and the cost of capital is not affected by capital structure.

Scarpellini et al. (2020) adopted a theory known as 'dynamic capacities' in order to further assess environmental competencies. As companies focus on environmental capabilities, CSR, environmental monitoring, and auditing, these are conducted using the same methodological methodology used to research environmental impact. This study contributes to the understanding of the link between EA analysis and market practices in the implementation of circular economy. Environmental skills were measured with partial least squares analysis for companies with more than 50 workers who were interested in eco-design, eco-innovation, eco-design, and green issues. There was shown to be a strong correlation between the use of complex skills theories and firms' degree of corporate social responsibility (CSR) and EA practices. Stakeholders' influence which mediates the role of small companies, is being enhanced by additional research that focuses on its effect on specific groups of stakeholders. Researchers also investigate whether a business's creativity affects environmental and financial health. The incongruent signification of the new findings established in this study allows circular economy practitioners to solve the traditional approach's problems and integrate a larger range of environmental knowledge. The benchmarks show both small and medium-sized businesses how to further self-internal assessment systems contribute to CSR. For governments, a greater understanding of the circular economy's entrance into the industry would aid in the development of policies that specifically favor its use in different regions. These results are also relevant to the way customers and partners interact with each other and to facilitate corporate social responsibility. This study goes beyond prior studies on circular economy to include EA as well as applying the circular economy from a transversal point of view. In the scope of dynamic skills, a review of accounting decisions in corporate and environmental competencies is very innovative.

CONCLUSIONS AND RECOMMENDATIONS

This paper commits to multiple kinds of literature, which includes EA. In order to build up knowledge on accounting principles, practices, standards, and measures, this EA research offers unique and growing chances for accounting scholars and professionals. Awareness on the global environment considerate permeates society. Academic or professional disciplines will not be immune from their ubiquitous implications. For instance, accounting academicians can commit

to these efforts by carrying out researches in order to benefit the public interest by improving the comprehension of accounting implications of environmental issues.

When considering environmental cost accounting, it is necessary to have an environmental cost accounting system based on cause-and-effect association. For better recognition and charging of environmental-related costs, this system is necessary. So EA system provides a significant road map for internal and external auditors in their achievements as well as helps the firms for improving performance. This will lead to achieving organizational goals, complying with environmental laws, and commits to the health of the ecology for future generations as well. This study explains the theories at various levels in describing EA. There are many positive impacts from EA on organizational performance improvement. So, there should be further researches on this area. But, the prevailing practice of environmental reporting must be critically examined.

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