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Elisabeth Albertini

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# **WHAT WE KNOW ABOUT THE ENVIRONMENTAL POLICY: AN INDUCTIVE TYPOLOGY OF THE RESEARCH**

**Elisabeth Albertini**

## **Abstract**

Environmental performance is a multidimensional concept that is difficult to measure since it concerns either the pollution generated by companies, their energy consumption and their different environmental policies. Academic research has used objective and/or non-objective indicators to measure this performance, dealing with both its managerial and measurement dimensions. This paper provides an inductive typology of the academic work concerning environmental policy through a computerized content analysis of 151 articles from 1992 to 2014 related to the management and measurement of environmental performance. The results highlight four major themes around which the academic research is organized: the relationship between environmental and financial performance, environmental performance under stakeholder engagement and institutional pressures, the strategic management of environmental performance, and increasing awareness of the sustainable development issue. Environmental performance research has evolved from a quantitative towards a more managerial dimension, highlighting the integration of performance within the management of a corporate business strategy.

## **Keywords**

environmental performance, environmental policy, literature review, content analysis, sustainable development

## Introduction

Environmental performance is a multidimensional construct. It includes not only the outcomes and impacts companies' have on their stakeholders and the environment, but also the principles of environmental responsibility and processes of environmental responsiveness that determine future outcomes and impacts (Orlitzky *et al.*, 2003; Schultze & Trommer, 2012). Environmental performance is therefore defined as the output of environmental management, that is, the effects the firm's activities and products have on the natural environment (Klassen & Whybark, 1999; Molina-Azorin *et al.*, 2009; Schultze & Trommer, 2012). According to this definition, environmental management encompasses the technical and organizational activities undertaken by the firm to reduce environmental impacts and minimize their effects on the natural environment (Cramer, 1998).

Since 1989, when the Coalition for Environmentally Responsible Economies (CERES) attempted to define the notion of environmental performance, academic research has used numerous and diverse indicators in order to measure it. These indicators can refer to a level of pollution or pollution reduction, relay organizations' initiatives, or reflect a variety of practices, such as recycling and reprocessing of waste. In this way, environmental performance is measured by objective or non-objective indicators allowing evaluation of the efficiency of a firm's consumption of resources (Dixon-Fowler *et al.*, 2013; Molina-Azorin *et al.*, 2009). Different measurement frameworks of environmental performance integrate these indicators on internal and external axes of procedures or results to satisfy the needs of reporting, disclosure, monitoring and management of environmental performance (Curkovic, 2003; Ilinitich *et al.*, 1998; Xie & Hayase, 2007). Environmental performance is therefore a multidimensional concept that has both managerial and measurement dimensions (Schultze & Trommer, 2012; Trumpp *et al.*, 2013).

How far has academic research covered the full complexity of the environmental issue in its

multiple dimensions? In what context has academic research used these objective and non-objective indicators? What are the main research questions? Since academic research has linked environmental performance closely to environmental management, we question the extent to these two notions have been considered separately.

In contrast to earlier literature reviews (Azzone *et al.*, 1996; Henri & Giasson, 2006; Molina-Azorin *et al.*, 2009; Rahman & Post, 2012), and to answer my research question, I propose an inductive typology of the academic work on this topic through a content analysis of the abstracts of 151 articles that contain the key words “environmental management” and “environmental performance” in either the titles or the abstracts. Content analysis is a systematic, objective, quantitative analysis of message characteristics (Berelson, 1952; Neuendorf, 2001) that allows us to identify authors’ points of view and describes the research trends in this field (Weber, 1990).

The aim of this literature review is to draw up an exhaustive and objective classification of the academic work on the multiple dimensions of environmental performance. The remainder of the paper is organized as follows. In Section 2 I review the different environmental indicators and frameworks used in academic research to measure environmental performance, and follow this with a description of the research method used (Section 3). I present the findings in Section 4 and introduce the typology of the research on environmental performance in Section 5. In the final section I discuss the findings and conclude.

### **Measuring environmental performance**

Environmental performance is defined as the measurable results of environmental management system (EMS) in relation to the control the organization has over its environmental aspects, aims, impacts and targets based on its environmental policy (Klassen

& Whybark, 1999; Molina-Azorin *et al.*, 2009). In that context, academic research has used numerous and diverse environmental performance indicators focusing either on the results of EMS (objective measures) or on the environmental practices themselves (non-objective measures) (Dixon-Fowler *et al.*, 2013; Lopez-Gamero *et al.*, 2009).

### *Objective measures of environmental performance*

Academic research presents environmental indicators as observable and quantifiable variables, reflecting the different ways in which environmental impacts can be caused by a given activity (Dixon-Fowler *et al.*, 2013; Ilinitich *et al.*, 1998; Xie & Hayase, 2007). These variables are given in physical, chemical, and biological units and expressed as either absolute or relative values. These proxies are positive when they measure the reduction of pollution and negative when they refer to the pollution produced. Furthermore, these data can measure resources consumed during the manufacturing process or the pollution generated by company's activity (Molina-Azorin *et al.*, 2009). These indicators also reveal a company's past behaviour, thus making it easier to compare companies and/or activities. However, they do not allow forecasting, which would enable polluting behaviour to be monitored (Tyteca, 1996; Xie & Hayase, 2007).

These environmental indicators are often calculated on the basis of data reported by companies through the Toxics Release Inventory (TRI) seen as a set of quality information on pollution (Hamilton, 1995; King & Lenox, 2001), yet not as a comprehensive indicator of a firm's total environment performance (Ambec & Lanoie, 2008). Other studies have used a pollution index drawn up by the Council of Economic Priorities (CEP) (Chen & Metcalf, 1980; Jaggi & Freedman, 1992), indices relating to environmental commitment, such as that of the Franklin Research & Development Corporation (FR&DC) (Russo & Fouts, 1997) or the reputation index or on non-financial grading, like the KLD 400 Social Index, carried out

by independent organizations.

Yet, the transparency and/or the validity of these databases may be incomplete (Rahman & Post, 2012). Hence, the conclusions drawn from these studies may not address the complexity of the environmental performance issue, leading to the increasing use by researchers of non-objective indicators to underline the management dimension (Dixon-Fowler *et al.*, 2013).

#### *Non-objective measures of environmental performance*

Academic research has shown that environmental performance is related to the EMS implemented by the firm (Klassen & Whybark, 1999). Moreover, Wood (1991) suggests that environmental practices and activities should be taken into consideration as soon as environmental performance is measured.

In this framework, academic research uses non-objective indicators to measure environmental performance, revealing the efforts companies make to reduce the impact of their activities on the environment (Molina-Azorin *et al.*, 2009; Schultze & Trommer, 2012). The implementation of EMS, the integration of environmental objectives in the firm's planning, eco-design, the product life-cycle analysis, the development of "green" products, and the company's voluntary participation in environmental programmes, are all measures of companies' environmental performance (Christmann, 2000; Molina-Azorin *et al.*, 2009). The adoption of an EMS is often presented as an indicator of a firm's capacity for sustainable environmental commitment (Melnik *et al.*, 2003) and its certification is considered as a legitimate indicator of the organizational changes involved in these policies (Goh Eng *et al.*, 2006). These non-objective measures highlight the practices implemented by firms, their goals with regard to their environmental responsibilities, and the EMS set up to manage these environmental strategies and improve environmental performance (Schultze & Trommer, 2012). It is less a question of measuring or reducing pollution, and more about giving an

account of the organizational changes these environmental strategies require.

## **Research methodology**

The aim of this study is to survey the research related to environmental performance, which is defined as the result of environmental management (Klassen & Whybark, 1999; Molina-Azorin *et al.*, 2009; Schultze & Trommer, 2012). A search in academic reference databases (EBSCO, EconLit, JSTOR, Academic Search Premier) of the keywords “environmental performance” and “environmental management” in titles and/or abstracts generated a sample of 151 articles published in peer-reviewed journals in the management field. For each of these references, the following characteristics were noted: publication date, journal title, track of the journal review, geographical zone of the university of the author(s), type of environmental performance indicator and type of research method. Each paper was read carefully in order to collect other useful information, such as theoretical background, research question, research design, types of indicators used in the study and the main contributions of the paper.

The scope of the study is based on the content analysis of the abstracts of these 151 articles. The choice of abstracts as an analysis sample is justified by the fact that they were written by the authors themselves in order to interest readers by presenting the main points of their work. Their compactness requires authors to select their words carefully. Thus, it is reasonable to presume that the analysis of words used in titles and abstracts will give a representative image of the whole article (Lesage & Wechtler, 2012).

As the aim of this study is to provide an inductive typology of the academic research relating to the measurement of environmental performance, a computer-based content analysis of these abstracts was carried out. This research method uses a set of statistical procedures to

make valid inferences from the text itself, the author or its audience. Content analysis can be used to identify the intentions and other characteristics of the communicator, reveal the focus of individuals, groups, institutional or societal attention, and describe trends in communication content (Weber, 1990). This method uses the verbal unit, as the database is particularly well suited to the case of longitudinal studies (Kabanoff *et al.*, 1995).

Given the large number of texts and the aim of meeting the requirements of replicability, we selected the computer-aided approach (Kabanoff *et al.*, 1995) as it reinforces face validity. We used the SPAD-T-V8 software, which provides useful frequency distributions of words, or analysis of words in context, and performs statistical analyses of textual data. This software suits quantitative narrative analysis, as it provides useful analytical tools for mapping clusters of words graphically (Franzosi, 2010). This methodology relies on textual statistics and allows the analysis of important texts on the basis of particular lexical contingencies, where the individual statistic is made up from the occurrence of a textual unit (word, lemma, segment, repeated segment) (Lebart & Salem, 1994).

The computer-based content analysis comprises several steps. First, the software generates a dictionary of all the words present in the database as well as their frequency (the 151 abstracts contain 3,574 different words with 24,149 occurrences). Then filters are applied to eliminate tool-words and articles in order to confine the dictionary to main words. In the case of homonyms, the software allows the user to consider the context of the word in order to decide whether or not to keep it. The lemmatization process that follows allows the user to bring together complex words related to the same semantic group. In this way, groups of words with the same roots can be formed around a significant keyword (Bolden & Moscarola, 2000). Finally, a second elimination phase allows the removal of words that appear infrequently. In this case the final dictionary is made up of 72 keywords representing 47.49% of occurrences.

Moving on from studying the words alone, I used the contingencies table (item\*words) on



which I ran a factorial correspondence analysis (FCA) with environmental performance as an active variable and the other variables as illustrative variables. This factorial correspondence analysis is completed by a classification of the keywords using a hierarchical cluster analysis. This last phase reveals a typology of four classes of significant keywords. The study of these classes reveals the characteristics of the academic research. The use of these statistical methods makes it possible to carry out an exploratory study of the content of the texts (Guerin-Pace, 1998) and present a typology of the significant keywords (Franzosi, 2010).

## Findings

One major theme stands out in this typology (Table 1). “The relationship between environmental management and financial performance” represents almost 35% of the academic literature on the measurement of environmental performance. Initially academic research tried to reassure shareholders, the principal providers of resources for the firm, through empirical studies of the relationship between environmental and financial performance. The objective indicators of environmental performance have been widely used to test Porter’s win-win hypothesis (1995) and verify how far environmental performance improves financial performance. In the light of these studies it seems that the relationship between environmental and financial performance is positive (Dechant & Altman, 1994; Hart & Ahuja, 1996; Madsen, 2008; Menguc *et al.*, 2010; Montabon *et al.*, 2007; Russo & Fouts, 1997; Wagner & Schaltegger, 2004; Walls *et al.*, 2011), even if some studies tend to prove the opposite (Cordeiro & Sarkis, 1997; Hassel *et al.*, 2005; Jaggi & Freedman, 1992; McPeak *et al.*, 2010), while others maintain it is impossible to prove (Christmann, 2000; Darnall, 2009; King & Lenox, 2001).

Despite a number of limitations, such as the diversity of environmental performance

indicators or the variety of research methods, these works show that environmental performance improves financial performance to a certain degree (Albertini, 2013). It has a greater improvement effect on a company's accounting financial performance than its market-based financial performance. Indeed, pollution prevention activities that are carried out within the framework of an environmental strategy imply that production processes should be modified in order to reduce energy consumption; production costs would be reduced, too, leading to competitive advantages (Al-Najjar & Anfimiadou, 2012; Lopez-Gamero *et al.*, 2009; Wagner, 2005). Moreover, the sale of environmentally friendly products allows companies to obtain a leading position in emerging markets for "green" products (Hart, 1995). Nevertheless, this relation has to be placed in a long-term context since it relies on very heavy investments, which tend initially to penalise profitability before eventually serving companies' purposes. Some authors have pointed out that the lack of a theoretical background does not allow for efficient testing of the link between environmental and financial performance (Cormier *et al.*, 2004; Wagner & Schaltegger, 2003).

Two further themes emerge from this typology, each representing almost 24% of the vocabulary.

The first is "Environmental management and institutional pressures", highlighting the two main kinds of pressure from civil society and government. The academic research on institutional pressures shows how much the firm is at the heart of a set of relationships with partners that include shareholders as well as actors interested in its activities and decisions (Hoffman, 2001). The research highlights the determining roles of government, civil society, certification organizations, media and other companies in the same sector in the introduction of environmental actions and the disclosure of environmental information (Brammer & Pavelin, 2008; Christmann, 2004; Dechant & Altman, 1994; Sharma & Henriques, 2005). Among these pressures, environmental regulations require companies regularly to

communicate information on their ecological footprint and greenhouse gas monitoring in order to satisfy environmental standards (Delmas & Toffel, 2004; Sharma, 2000). A significant increase in environmental disclosure leads academic research to study its possible exploitation by companies as a way of managing public impressions or of increasing legitimacy (Cormier & Magnan, 1999). The need to reassure worried stakeholders motivates companies to disclose very detailed reports that encourage stakeholders to give more rapid approval to a polluting industrial activity (Sinclair-Desgagné & Gozlan, 2003). The optimistic tone adopted by companies in their annual reports or on their websites may mask poor ecological performance and does not allow the classification of firms according to their environmental performance (Cho *et al.*, 2010).

The other theme that represents almost 24% of the vocabulary is “Increasing awareness of the environmental issue”. The research focuses on very concrete topics such as pollution, sustainability and ecological issues through objective indicators used in empirical studies. This relatively recent field of study interests mainly Asian or North American researchers publishing in accounting and auditing reviews. In the context of “ecological” issues, researchers refer to the need for a more sustainable way of manufacturing that seeks to reduce the carbon footprint. These studies mention regulatory or voluntary approaches to pollution control implemented by companies in order to reduce pollution levels. The keyword “sustainability” refers to the preference for a sustainable development approach rather than a financial approach. These studies insist that corporate sustainable performance should meet economic performance goals.

The final theme emerging from this typology is “Strategic management of environmental performance and environmental reporting” and represents 18% of the vocabulary. NRBV articles try to identify the dynamic and inimitable organizational capacities that enable a

company to gain a strong competitive advantage through a proactive environmental strategy (Aragon-Correa & Sharma, 2003; Dangelico & Pontrandolfo, 2015; Hart & Dowell, 2011). This competitive advantage relies on the company's capacity to bring together all its resources (human, financial, material) by applying knowledge and know-how within the framework of an environmental strategy (Judge & Douglas, 1998). It allows firms to invest in new and unexplored markets for green products in advance of their competitors and sometimes even influences future regulations by presenting their expertise to the government (Porter & van der Linde, 1995). This research theme is based on non-objective indicators that highlight environmental innovations, staff training, setting up a dedicated department and planning the roll out of environmental practices (Christmann, 2000; Menguc & Ozanne, 2005; Nakao *et al.*, 2007). The research underlines the association of the reporting of environmental performance and the management of this performance for companies that interact with external actors, such as their supply chain strategies (Darnall *et al.*, 2008; Handfield *et al.*, 2005). Environmental performance indicators may have an external value for environmental reporting purposes or an internal value for managing the corporate environmental performance. This corresponds to two logics of the representation of environmental performance (Xie & Hayase, 2007).

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Insert Table 1 here

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## **Discussion and conclusion**

To sum up, research on the measurement of environmental performance centres around four major themes: (1) the relationship between environmental management and financial

performance; (2) environmental management and institutional pressures; (3) toward an increasing awareness of the environmental issue and (4) strategic environmental management and reporting. This typology illustrates the varied contexts in which environmental performance indicators have been used in academic research, and the efforts made by researchers to cover the complexity of the environmental management issue. Academic research shows that an increasing number of companies use objective and non-objective indicators to measure their environmental performance with the aim of managing this performance internally and reporting the information to institutional stakeholders in conformity with regulations. In addition, the joint use of objective and non-objective indicators by academic research underlines the interdependence of these indicators to measure environmental performance in line with its definition (Arjaliès & Mundy, 2013).

From this typology, we can draw some conclusions about what we know about the environmental policy literature.

First, the research questions as well as the context of the studies have determined the different uses of environmental performance indicators. Numerous empirical studies of the relationship between environmental and financial performance have caused the academic research to digress from the main question, which is how to measure the impact of corporate activities on the natural environment. The same goes for academic research that studies environmental disclosure as a way for companies to gain or maintain their legitimacy. These studies use environmental indicators not to measure the negative externalities caused by companies (Larrinaga *et al.*, 2002) but rather to determine the financial consequences of environmental practices or the extent to which companies are practising “greenwashing” (Cho, 2009). Furthermore, studies about the relationship between environmental and financial performance have not reached a consensus about the strength of the relationship. Even if the overall relationship is positive, the kind of indicators chosen to measure either environmental or

financial performance deeply influences the strength of the relationship (Albertini, 2013). This lack of consensus on how to measure environmental performance and its consequences on financial performance contributes to the lack of theoretical foundation, calling into question the knowledge convergence (Aragon-Correa & Sharma, 2003).

Second, the different theoretical backgrounds chosen by researchers clearly influence the way the environmental issue is studied. The stakeholder perspective highlights conflicting pressures from internal (customers, employees, stockholders) and external (regulators, environmental activists, non-governmental organizations) stakeholder groups (Clarkson, 1995). Institutional theory suggests that rules, customs or beliefs guide and constrain the behaviour of organizations (Scott, 2008). Hence, studies in these academic streams have often posited the environmental commitment of companies as an answer to stakeholders' demands or institutional constraints in a reactive rather than a proactive way.

Third, the definition of environmental performance is ambiguous since it refers to the management of environmental performance as well the results of management. Yet, these two notions are independent of one another (Lopez-Gamero *et al.*, 2009). The management of environmental performance does not lead systematically to a reduction in pollution caused by a company's activities. Some environmental practices stimulate financial incomes, allowing companies to increase their profitability without reducing the impact of their activities on the natural environment (Bansal & Knox-Hayes, 2013). Furthermore, companies take advantage of this multiple definition of environmental performance. They can disclose significant information about their environmental management practices through their annual reports, even if these practices are inadequate when it comes to reducing the pollution caused by their activities. The lack of audit of their environmental results allows companies to disclose their environmental management practices with the aim of maintaining or increasing their legitimacy (Cormier *et al.*, 2005). Thus, the ambiguous definition of environmental

performance prevents not only a clear understanding of this issue but also the development of a theoretical foundation (Hoffman & Bansal, 2012).

Fourth, this study underlines the different contexts in which the indicators have been used in academic research to measure environmental performance. There is no doubt that environmental performance is quantified with the aim of measuring the relationship between environmental and financial performance and determining its significance. Nevertheless, the research has evolved little by little towards a more managerial dimension of environmental performance, as shown by the increasing use of non-objective as well as objective indicators. This may highlight a significant change in research question. Indeed, after studying why companies implement environmental strategy and how far this impacts financial performance, it seems that research is more about how companies address the consequences of climate change that impact their corporate business strategy. Even in developed countries, the increasing scarcity of certain resources obliges companies to modify their manufacturing process in order to make them more energy efficient. Indeed, physical impacts from climate change pose major challenges for organizations (Winn *et al.*, 2011) and determine the environmental strategies (Sprengel & Bush, 2011).

Fifth, limits to the indicators themselves can be highlighted. This typology demonstrates that some research features indicators of questionable accessibility and reliability. Moreover, these objective indicators do not allow us to attribute improvement in environmental performance to any one specific pollution prevention practice because the connections between a company's activities and the natural environment are complex. As for the non-objective indicators mobilized during the research, they are directly linked to the company and its activity, making generalization and repeat studies very difficult. Moreover, the validity of the use of non-objective indicators to measure the environmental performance of companies has still not been established empirically (Ilinitich *et al.*, 1998).

From this typology based on the environmental policy literature, we can now suggest an agenda for future research.

First, as this typology has highlighted, environmental performance indicators seem to be a significant communication tool in the relationship between a company and its external stakeholders. Indeed, firm's environmental disclosure enhances the quality of the analysts' information context, which ultimately allows them to make better forecasts (Cormier & Magnan, 2015). It would be interesting to study the extent to which environmental disclosure is a part of integrated reporting for companies and what types of indicator are used in this specific reporting (Jensen, 2012). Furthermore, it may be interesting to determine the extent to which a company can comply with mandatory external reporting and manage environmental performance internally using the same indicators. In other words, can environmental performance indicators be used to report environmental performance to external stakeholders and at the same time be used to manage that performance internally to satisfy shareholders?

Second, environmental performance is measured through objective indicators that highlight the consequences of corporate activities on the natural environment and non-objective indicators that enhance knowledge about the environmental practices implemented by companies. It might be interesting to study the extent to which the joint use of these indicators through a management control system could help companies to obtain a sustainable competitive advantage from environmental issues. Third, the lack of consensus about the relationship between environmental and financial performance seems to show that this relationship may be indirect rather than direct (Aragon-Correa & Sharma, 2003; Lopez-Gamero *et al.*, 2009). Thus, there is a need to study the potential moderator or mediator of this relationship, such as corporate strategies (Wagner, 2005), environmental innovation (Forsman, 2013) or organizational capabilities and resources (Aragon-Correa & Sharma, 2003; Dangelico & Pontrandolfo, 2015). Indeed, technological capital such as innovative



capacity, relational capital such as relationships with customers and business partners, or human capital such as training could be significant mediators in the relationship between environmental policy and financial performance. Furthermore, as the strength of this relationship differs according to the type of financial performance indicators used in empirical studies, further research might question a financial indicator that could reflect the long-term return on investment of these environmental practices and the competitive advantage they provide to the company as well. Fourth, as these capabilities provide a sustainable competitive advantage, further research might seek to enhance knowledge about the kind of capabilities and resources that need to be developed from a contingent resource-based perspective (Aragon-Correa *et al.*, 2008). Since the success of proactive environmental strategies rely on organizational capabilities such as a shared vision of the environmental issues within the company, stakeholder pressure management, business redefinition, environmental product innovation and new process design to reduce pollution (Aragon-Correa *et al.*, 2008), further research could study how companies enhance the development and the implementation of these capabilities. Indeed, qualitative studies, such as case studies, might enhance significantly our knowledge of these deeply embedded organizational capabilities. Fifth, since academic research has mainly focused on the top managers' role in the commitment of the firm to a proactive environmental strategy, research on the specific role of the employees in the environmental decision-making process could enhance the knowledge of the microfoundations of the environmental policy success (Torre-Ruiz *et al.*, 2015). Indeed, organizational citizenship behaviours for the environment, based on individual and voluntary initiatives, are increasingly considered as an essential ingredient of corporate greening (Boiral, 2009; Boiral *et al.*, 2015; Temminck *et al.*, 2015). In that context, research can study to what extent employees of a proactive environmental company generate a positive 'word of mouth' influencing consumers' way of purchase.

To conclude, this typology highlights four major themes around which the academic research is organized: the relationship between environmental management and financial performance; environmental management and institutional pressures; toward an increasing awareness of the environmental issue and strategic environmental management and reporting. From this typology, several future research questions could be addressed such as the possible connection between the environmental disclosure and the integrated reporting, the influence of mediators or moderators on the relationship between environmental policy and financial performance, the extent to which a management control systems can enhance the efficiency of the environmental strategy and the resources and the capabilities that need to be developed to improve the competitive advantage generated by an environmental policy.

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Table 1

Typology of the research relative to the measurement of environmental performance

Theme	No. of words	Theme characteristics	Theme keywords (in <b>bold</b> : most characteristic and maximum contribution )
The relationship between environmental management and financial performance	25	<i>Empirical studies, objective indicator, organization and production reviews, first period (1992–2000)</i>	Achievement, <b>company</b> , consumption, development, <b>disclosure</b> , factor, <b>financial</b> , implementation, human resource, <b>implications</b> , improvement, <b>indicators</b> , innovation, integration, issue, <b>leadership</b> , manufacturing, <b>measurement</b> , perception, <b>performance</b> , proactive, reduction, relation, role, <b>shareholder</b>
Environmental management and institutional pressures	17	<i>Non-objective indicator, case study, normative study, agriculture and environment reviews</i>	<b>Certification</b> , <b>EMS</b> , framework, <b>green</b> , industry, legitimacy, <b>management</b> , market, <b>new</b> , <b>operation</b> , practices, production, <b>quality</b> , <b>regulation</b> , <b>stakeholder</b> , supply, technology
Increasing awareness of the environmental issue	17	<i>Objective indicators, empirical studies, last period (2008–15), Asian and US study area, accounting and auditing reviews</i>	<b>Agricultural</b> , benefit, capability, <b>control</b> , cost, decision, <b>ecological</b> , Economic, <b>effective</b> , increase, information, investment, <b>long</b> , <b>pollution</b> , <b>process</b> , <b>sustainability</b> , <b>value</b>
Strategic environmental management and reporting	13	<i>Objective and non-objective indicators, second period (2001–7), human resources reviews</i>	Adoption, <b>board</b> , commitment, <b>competitive</b> , <b>goal</b> , institutionalization, mediator, <b>policy</b> , pressure, <b>public</b> , reporting, <b>resource-based</b> , <b>strategy</b>