

# **A FRAMEWORK FOR CORPORATE ENVIRONMENTAL PRACTICES AND ITS APPLICATION FOR ENHANCING ENVIRONMENTAL MANAGEMENT**

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## **ABSTRACT**

The research reported in this paper explicates environmental management practices more comprehensively than has been attempted previously. Environmental management practices are grouped into those that relate to operational, tactical and strategic levels of a firm. While these firms engage in many environmental practices to varying degrees, the results of this study suggest many firms are emphasizing a subset of practices at the operational and strategic levels. The conceptual framework and results of this study can be used to develop measurement scales to guide additional research in this area.

## **INTRODUCTION**

Environmental Management Practices (EMPs) are being employed more widely due to changing business conditions that emphasize environmental performance. Consequently, meaningful and effective tools for measuring environmental performance are increasingly important due to the costs of environmental options and to comply with regulatory pressures and the concerns of consumer groups. Additionally, adopting voluntary environmental initiatives such as the International Chamber of Commerce Business Principles for Sustainable Development and international standards such as the International Organization for Standardization's (ISO) 14001 have impacted firms in recent years (GEMI, 1997), causing them to emphasize environmental programs and their corresponding EMPs.

To date, there have been a number of different ways to label Environmental Management Practices (EMPs). These labels include industrial ecology (Arthur D. Little, 1991) environmental operations management (EOM) (Gupta and Sharma, 1996), environmentally conscious manufacturing (ECM) (Sarkis and Rasheed, 1995), and environmentally responsible manufacturing (ERM) (Melnyk and Handfield, 1995) to name a few. What these descriptive labels have overlooked is a more detailed list of the environmental

activities corporations practice at the operational, tactical, and strategic levels of the firm. While there are a number of specific practices that can be found within industrial ecology, these same practices may not be found within environmental operations management. While there is overlap between the different environmental labels, there are also many differences. To clarify this potentially confusing situation, researchers and practitioners need a more comprehensive approach to defining EMPs. This situation presents a unique opportunity to explicate EMPs, and understand why some firms have readily adopted EMPs while other firms have taken a 'wait and see approach'.

While some firms have adopted these practices piece-meal, others have taken a more integrated approach. The motivation for adoption of environmental programs has also varied, with some firms simply reacting to new regulations, while others are proactively seeking a higher resource productivity promised by these practices. The aim of this study is to present a more comprehensive approach to cataloging EMPs, provide some insights as to why firms are engaged in these activities, and present a more comprehensive framework of EMPs that can be used for the development of theory in the growing field of environmental business research.

A review of current literature reveals that it is mostly focused on the high level, strategic issues of EMPs relating to sustainable development or descriptions and analyses of specific environmental tools. Much of the current research is largely anecdotal and derives from case studies, which do not provide a framework for comprehensively evaluating the environmental practices of a firm. While there are a number of groups (i.e., The Dow Jones Index of Sustainable Companies, Business and the Environment, and Safety and Environmental Risk Management) that have developed environmental indexing measures, these organizations are mostly focused on environmental and financial 'risk' assessment. The lack of a comprehensive and common definition of EMPs has impeded the dual objectives of

measurement and comprehensive assessment of the impact of EMPs on performance. The research presented in this paper is an attempt to fill this gap in the environmental practices literature. This paper develops a taxonomy of existing literature on EMPs and uses this as a basis for developing a hierarchical framework for defining environmental practices which can be used for measurement and impact assessment purposes. The applicability of the suggested framework is evaluated based on data collected from a sample of European and North American firms who have been early adopters of EMPs.

## LITERATURE REVIEW

In reviewing the literature for the growing domain of environmental business research, three common features stand out. First, most articles focus on one of the three levels in which EMPs relate to decision making, i.e., operational, tactical and strategic (see Royston 1980, Epstein 1996 and Rondinelli and Vastag 1995). Second, articles tend to focus on one tool or technique or a small group of tools and techniques (see for example Miettinen and Hamalainen 1997). Third, many of the articles are anecdotal, or conceptual and there tends to be a lack of empirical emphasis (for example, Sharfman, Ellington and Meo 1997). While previous research has done much to illuminate and define the field, there is a lack of agreement surrounding the idea that environmental responsibility is a holistic philosophy requiring the pursuit of EMPs at all three levels.

For purposes of our discussion, operational decisions refer to the day to day decisions and practices of the firm and typically involve shop floor level personnel. These practices include scheduling, sequencing, and capacity planning. Tactical decisions such as product design involve middle managers and affect the deployment of resources. Examples of tactical decisions include Design for Environment, Life Cycle Analysis, or Environmental Management System development and integration (Sroufe, R., Curkovic, S., Montabon, F., and Melnyk, S. 2000). Strategic decisions have a long-term impact on the direction of the firm. These decisions typically involve top management goals and statements regarding how the firm will create value. While our literature review is by no means all-inclusive, we present a taxonomy of relevant literature relating to EMPs, organized chronologically and by the principal focus of the articles. The majority of the articles have tended to focus on 'strategic' issues as they relate to the environmental posture of the firm. A minority of empirical studies have focused on operational and tactical environmental practices. In reviewing these studies, one can start to identify the dimensions of EMPs.

## EXPLICATING ENVIRONMENTAL MANAGEMENT PRACTICES

Based on the review of existing literature, knowledge of the researchers, and discussions with managers having corporate responsibility for environmental issues, a list of operational, tactical and strategic EMPs was compiled.

EMPs in firms are viewed as belonging to three categories; operational, tactical, and strategic. To further elucidate these groupings, operational level environmental practices can be viewed as fundamentally 'internally focused' and strategic level environmental practices can be viewed as 'externally focused'. Tactical level practices fall somewhere between operational and strategic practices and can be viewed as representing both an internal and external focus. These groupings represent an attempt to recognize that environmental practices pertain to diverse foci, represent different resource commitments, and target a wide range of goals and objectives. For a firm to be committed to environmental responsibility, it must be cognizant of holistic environmental concerns. If a firm is going to commit itself to an environmental initiative, it will be difficult for it to be fully successful unless activities across operational, tactical and strategic practices are coordinated.

## DATA COLLECTION

Corporate environmental reports from 1997 and 1998 were collected from multinational companies identified as early adopters of EMPs. The primary criterion used to select the organizations in the study was that they had been recognized and commended for environmental performance in the popular press (Anonymous 1993; Wall Street Journal 1997). In addition, some firms were selected based on the researchers' knowledge of the firms and their EMPs. Initially, a list of 96 potential firms was developed. Corporate environmental reports were either downloaded from web pages or requested in hard copy from the individual firms. If a firm did not have a corporate environmental report they were subsequently eliminated from the study. This resulted in a sample of 45 firms.

Content analysis was performed using four student raters. The students attended a training session in which they were briefed on the objectives of the research and trained on how to fill out the coding sheets used for data collection. The researchers explained the coding process for a sample firm using standard definitions. See Appendices 1 and 2 for the definitions used and coding matrix. A rating for each environmental practice was captured on a five point Likert scale, with 1 meaning a low intensity of involvement with the practice, and 5 meaning a high intensity of involvement. The level of intensity is a qualitative decision the raters made based upon the amount of information on an environmental practice found within the corporate

environmental report. Following the training sessions with the raters, each rater independently completed a coding sheet for each firm in the study based on the environmental reports. When all reports were coded, inter-rater reliability analysis was performed using standardized item alphas across the raters. Next, the researchers reviewed the work of the raters for completeness and entered the coded data into a database.

## ANALYSIS AND RESULTS

To establish reliability across raters of the corporate environmental reports, inter-rater reliabilities were calculated on each of the three planning levels (tactical, operational, and strategic). Reliability is supported with the standardized item alphas across raters have single and average interclass correlations within the 95% confidence intervals and F values significant at the .05 level.

The results help to highlight key practices, by showing which practices are used more. These practices are indicated by average intensity of involvement scores of at least a 3.0. Using a Likert scale from 1 (low intensity) to 5 (high intensity), 3 was chosen as the cutoff for important practices because it is the mid-point of the intensity scale used by the coders. The practices scoring equal to or greater than 3.0 include waste reduction, resource reduction, resource allocation, recognition, environmental policies and programs. Specifically, the overall data analysis indicates operational practices such as recycling and proactive and reactive waste reduction, energy reduction and communication of environmental information are the more prevalent practices. Key tactical practices include telling stakeholders that the firm is doing well through the announcement of participation in environmental programs and awards for this participation. Important strategic practices involve corporate environmental policy, the use of employee programs and taking a long-term approach to environmental practices.

This overall picture shows that strategic corporate environmental policy receives the highest average score of all EMPs, suggesting the importance with which these firms view the development of a corporate environmental policy. Employee programs to increase awareness of environmental responsibility and a long-term commitment to environmental management also received relatively high scores. Operational practices involving recycling and waste and energy reduction receive relatively high average scores ranging from 3.4 to 3.0. Given the information from the literature review and the nature of the firms included in the study, we would expect high scores on these dimensions. However, it was somewhat surprising that several of the operational level practices received scores that were

substantially below 3.0, given their amount of coverage in the literature.

The results also indicate that operational practices such as reporting environmental information through accounting, and tracking this information along with rewarding environmental projects score relatively low. Based on conversations with managers, the low score for reporting environmental information may be due to proprietary reasons. The low scores for rewards/incentives for environmental projects received in our study seems to indicate that firms may have these incentive systems in place, but do not place much emphasis on reporting these rewards in their environmental reports.

Despite an increase in academic research and practitioner interest in supply chain management (Mabert and Vendataramanan 1998), the supply chain practices studied in this research score relatively low. An interesting result is that tactical practices involving supply chain management receive low scores. It is important to note that in the firms studied, tactical level EMPs are underemployed. In the design and development category, environmental design and product developments receive moderate emphasis. However, supply chain management practices receive relatively low scores. Tools and techniques such as life cycle analysis, risk analysis, and environmental audits of suppliers and supply chain partners receive low scores suggesting that the potential offered by these techniques remains essentially untapped. Firms looking to improve their performance and 'bottom line' impact might want to stress these, as yet, unexplored areas of EMPs.

## CONCLUSIONS

Most of the EMPs analyzed in this study are seeing some use in firms. However, in the overall sample averages, none of the EMPs score a 4.0 or greater. These two facts seem to indicate that while there is definite industry interest in using EMPs, firms are perhaps being either cautious or slow in embracing them. This may indicate that firms are waiting for clear evidence that the cost/benefit ratio of various EMPs are favorable before committing fully to all EMPs, or they are only committing the practices where they perceive the largest impact on the firm. Given the limitations of this study, the results of our research help to establish a new EMPs framework. The results of this study show that the EMPs of a firm include tactical, operational, and strategic activities. It is the combination of these three categories that help to identify the commitment of a firm to EMPs. Future research will need to operationalize the EMP construct, find the optimal combination of EMPs for specific types of firms, and test relationships to firm performance.

*Full references available upon request.*