Environmentally Responsible Manufacturing: Assessing the Current State in American Industry

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ENVIRONMENTALLY RESPONSIBLE MANAGEMENT:
ASSESSING THE CURRENT STATE IN AMERICAN INDUSTRY

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ABSTRACT

To some managers Environmentally Responsible Manufacturing (ERM) can be seen as an opportunity to better understand processes and reduce waste. To others, ERM is an unwarranted intrusion into their functional responsibilities. This paper explores the reasons for these two very different views of ERM. The paper begins by defining the concepts of ERM and Environmental Management Systems (EMS) and identifying the reasons for the increasing importance now associated with each of these concepts. Drawing on the results of a large-scale survey of American managers, a summary of current practices associated with EMS at the plant level is given. Additionally, analysis of the impact of EMS on corporate performance and environmental options is presented.

ENVIRONMENTALLY RESPONSIBLE MANAGEMENT

Any meaningful discussion of the impact of environmentally responsible management systems and practices must begin with a definition of this concept. In this study, we define ERM as:

A corporate system that integrates product and design issues with issues of production planning and control and supply chain management in such a manner as to identify, quantify, assess, and manage the flow of environmental waste with the goal of reducing and ultimately minimizing its impact on the environment, while also trying to maximize resource efficiency.

Underlying this definition is the implicit assumption of a positive relationship between environmental and corporate performance. Associated with this definition are several important assumptions and premises (Smith & Melnyk, 1996):

- ERM decisions are always present and are integrated (and part of) with the business process.
- The ultimate goal of ERM is waste elimination.
- To be ultimately successful, ERM must be viewed as a strategically-driven decision that is evaluated by comparing its relative costs and benefits (and making appropriate decisions based on this analysis).
- Effective ERM systems must be viewed as corporate systems, not as manufacturing, engineering or purchasing decisions.
- Effective ERM systems must focus on the three Ps – Product, Process, and Packaging.

- To be ultimately successful, ERM must be integrated into the product and process design and development system.
- To be ultimately successful, ERM must be considered within the context of both the internal factory (the manufacturing system found within the four walls of the enterprise) and the external factory (the transformation process as it involves the supply chain).
- ERM is ultimately a cross-functional undertaking.
- ERM is dynamic.
- ERM is primarily process oriented as compared to outcome (end-of-pipe) oriented.
- While the ERM is the overall approach, most firms and managers deal not with ERM but rather with the Environmental Management System (EMS).

RESEARCH METHODOLOGY

The primary approach used in this research article is that of a large-scale survey complemented by extensive field interviews at selected plants. The reason for the survey is to allow the research team to record the attitudes of the respondents towards ERM, their environmental management system, and ISO 14000. The survey is also used to identify factors that influence these attitudes and the perceived effectiveness and efficiency of the plant environmental management systems. The survey is appropriate in that its objective is to collect data.

ENVIRONMENTAL MANAGEMENT AND CORPORATE PERFORMANCE

The relationship between environmental systems, environmental performance and overall corporate performance is not clear. Some writers, such as Makower (1993, 1994) and Porter and Van der Linde (1995, 1995), have argued that by becoming more environmentally responsible, firms also uncover new sources of waste and productivity. The result is that enhanced environmental responsibility results in improved corporate performance. Other writers, primarily Walley and Whitehead (1994), argue that this is not the case. In most instances, improved environmental performance comes at the cost of reduced profitability and reduced shareholder value.

One way of evaluating the nature of this relationship is to ask the respondents to assess the impact of their environmental management systems on several critical dimensions of corporate performance. To this end, a section was included that focused on this specific aspect of performance. The respondents were asked to evaluate the impact of their environmental management system on 14
dimensions of performance. Some of these dimensions focused on core strategic areas (cost, lead time, cost and market position). Others touched on areas such as reputation and customer acceptance. Still others dealt with issues of process/product design and cost/benefit assessment. As with many of the other questions, the respondents were asked to assess the impact of their environmental management system using an 11 point scale (0 – “Strongly Disagree;” 10 – “Strongly Agree”).

MANAGERIAL IMPLICATIONS

At the plant level, EMS is perceived primarily as a formal, reactive internally oriented system that is used to ensure compliance with the appropriate regulations. The results show that the EMS, the focus of this study and primary corporate vehicle for achieving ERM objectives, is multi-dimensional and complex. It is a formal corporate system; it is also an information/benchmarking system. EMS is responsible for ensuring compliance and for preventing waste. It is also charged with tracking and monitoring environmental performance. For the most part, the EMS is operational and reactive in nature. It is most evident after a problem has occurred. EMS is for the most part not involved with cost accounting. As a result, it is unable to identify and measure the quantitative and qualitative costs associated with environmental performance. While, for many firms, EMS is execution focused, it still can influence product and process design decisions. While reactive and operational in most plants, EMS has the potential for being proactive (a potential currently unrealized in most firms).

SUPPLY CHAIN OPPORTUNITIES OF ERM REMAIN RELATIVELY UNEXPLORED

Most environmental management systems deal primarily with the environmental problems and opportunities as they exist in the internal factory. While there is awareness that the supply chain can have a great impact on pollution problems in the internal factory (both in the creation of these problems and in their resolution), little effort has been devoted to involving the supply chain in pollution reduction efforts. As a result, the insights, skill and expertise of the suppliers go unused. As a result, environmental information and performance has little or no influence on supplier selection, retention, or evaluation. Improving environmental performance by involving the suppliers is something that most realize should be done, but yet few do. Environmental management systems use a wide range of options to deal with the various environmental problems.

This diversity is also very evident in the range of options used by the EMS to enhance environmental performance. Numerous approaches are used, some of which are “end-of-pipe” (such as recycling) while others are remedial (such as product and process redesign). It is interesting to note that options such as relocation (which essentially involving the “exporting” of pollution) are very infrequently used. This variety of options also implies that the plants are aware of the availability of these options and that the management is willing to make use of them, when these options effectively deal with the environmental problems and are cost-effective.

EMS, at the plant level, is seen as having relatively little impact on corporate performance. When asked to assess the impact of their plant’s EMS on overall performance, the respondents painted a picture of a system generating very mixed results. On one hand, environmental management systems tend to increase lead times (both in design and delivery), reduce quality, and increase costs. These are important effects because they shape the ability of the firm to effectively compete in today’s increasingly more demanding marketplace (Melnyk & Denzler, 1996). On the other hand, the EMS is not seen as adversely affecting the firm’s position in the marketplace and its reputation in the eyes of its consumers. These finding would seem to argue against investing any more than the minimum amount in any ERM-related initiative. However, the results indicate that many plants are making a significant commitment to improving the environmental performance of their plants by becoming involved in several new ERM-related initiatives.

RECENT ERM DEVELOPMENTS

The last five years have seen the emergence of four new developments that impact on the practice of ERM. These developments are formal initiatives aimed at enhancing and improving environmental performance. These developments consist of the following: Voluntary Industrial Environmental Programs. The first approach consists of environmental programs that are initiated and championed by firms operating in specific industries. The most noteworthy example of this category is the Responsible Care® program that was pioneered by Dow Chemical and now accepted by as the environmental system for the chemical industry. Voluntary Govt.-initiated Environmental Programs. In contrast to the preceding approach, this approach consists of programs supported by the government, specifically the Environmental Protection Agency (EPA). Examples include the Green Light® and the 33/50 programs. In these cases, it is the governmental agency, not the firm, that acts as the initiators of these programs. Voluntary Programs Where Improved Environmental Performance Is A Secondary Benefit. In the previous two sets of programs, improved environmental performance is the desired and primary outcome of these programs. In contrast, this category of alternatives focuses on another set of outcomes. For example, the programs run by OSHA (Occupational Safety and Health Agency) focus on improving the safety of the environments in which the
employees work. However, it can be argued that any action that improves safety must, by definition, focus on environmentally related activities such as pollution prevention and reduction. The reason is that increased pollution (either through exposure to or the handling of it) negatively contributes to such objectives.

**ISO 14000 Environmental Certification Standard.** The ISO 14000 standard is a relatively new development that specifies the structure of information technology in the form of an EMS that an organization must have in place, if it seeks to obtain certification. Formally adopted in 1996, this standard attempts to build on the success and experience of the ISO/QS 9000 standards in quality. Like ISO 9000, ISO 14000 involves external validation through third-party certification of the efforts.

These four developments embody certain very important differences. For example, the first three tend to focus on the outcome (reduced pollution) while the fourth, ISO 14000, focuses on the processes by which reduced pollution can be achieved. Further, the first three do not involve external validation. In spite of these differences, these four developments raise a more interesting issue, that of why any firm should consider pursuing any of these developments. If, as pointed out in this paper, the EMS has only marginal benefit for the firm, then there seems to be little advantage to be gained by implementing one or more of these environmental initiatives. Yet, there is strong evidence offered by the survey that plants are actively involved in these programs. The data from the survey indicated that out of the 1510 respondents, 476 (31.5%) noted that their plants were actively involved in the voluntary industrial environmental programs (i.e., they were either implementing this program or they had implemented it). Similarly, 404 (26.8%) were involved in the voluntary EPA programs, 473 (31.3%) were involved in voluntary programs where improved environmental performance was an important secondary benefit, and 121 (8%) were actively pursuing ISO 14000 certification. These findings lead to the paradox of plants pursuing such initiatives in spite of the limited perceived impact of EMS systems. The resolution of this paradox would seem to hinge on the benefits and costs incurred in implementing them. After all, why would any plant invest further resources in any activity that would seem not to generating any significant, verifiable returns for the firm? It is left for other papers and studies to resolve this paradox.

**CONCLUDING COMMENTS**

This research begins by presenting the extreme positions taken by managers when dealing with ERM and its formal corporate system, the environmental management system. At one extreme, there are those who view ERM as something that ultimately has a positive impact on the firm. At the other extreme, there are those who view ERM as a constraint and as a cost. What this paper has shown is that the truth lies somewhere between these two extremes. The findings seem to imply that most managers view ERM and EMS's being necessary “evils.” ERM is currently a system where most managers know the costs associated in working with this system, yet, few have realized or explored all of the potential benefits offered by this system.

References available upon request from Steve Malnyk.