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**TITLE**

Introduction

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# Introduction

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The increasing awareness, importance and understanding of environmental management systems (EMS) has demonstrated relationships with sustainability, competitiveness and new institutional practice. The EMS debate is well into its second decade of discussion among academics and practitioners, as EMS standards have become established as mainstream business practice. A general assumption is that most firms have some version of an EMS in place, with systems ranging from informal policies and practices to formalised third-party certified systems that are widely publicised by the firm and integral to its strategic direction. Regardless of the level or type of system chosen, practitioners and researchers seek to examine and better understand the extent to which EMSs are cross-functional, how they impact on performance evaluation, the extent to which they are capable of monitoring supply chains and life-cycles, whether their scope can be extended to include social factors and, crucially, whether they contribute to better environmental performance. These are just some of the current and emerging issues.

To date, definitional ambiguity and dissonance has left practitioners with few EMS frameworks or insights. Simultaneously, researchers and practitioners struggle with environmental (and social) performance measurement and system integration. As corporate environmental management has a greater role and linkage with corporate social responsibility, the intangible nature of this latter concern adds complexities to its integration with EMS. In addition, competitive pressures have evolved where managers are now required to develop and produce goods and services that are of consistently high quality, have shorter lead times, are less expensive and more flexible, but which also have added dimensions of being environmentally and socially responsible. An understanding of how these requirements are to be achieved is not fully supported by empir-

ical research. Substantial progress is needed in order to achieve a better understanding of EMSs and their roles.

Because of growing environmental regulations, government pressures, international certification standards such as the International Organisation for Standardisation (ISO) 14000 series, changing customer demands and managers; recognising the business and environmental impacts of better environmental performance, firms are now developing environmental policies for their operating facilities, services and supply-chain partners while trying to maintain consistency with new regulations. At a global level, managers, researchers and other stakeholders are recognising the importance of EMSs from operational and strategic perspectives. For managers, deciding how to address environmental issues and transforming this recognition into an effective management system is a complex challenge. EMS can be involved in responding to external institutional pressures and internal functional requirements, as well as contributing to decision-making at all levels in an organisation; these multiple roles, in conjunction with their broadening scope of applicability, contribute to the complexity of managing these systems and their integration.

An EMS should help ensure that strategic and operational decisions are integrated. At the strategic level it is important to understand the impact of an EMS in handling uncertainties, strategy development, providing accurate and timely performance measurement, and reaching goals. At the operational level, however, concerns focus on measurement of processes, short-term management and accountability. EMSs that are designed to address uncertainties in the external regulatory environment, stakeholder requirements and internal performance standards are issues that plague managerial discretion and decision-making, almost daily. Having EMS capabilities that deal with uncertainty also becomes a problem of scale and scope. The solution is to translate environmental requirements, as an extension of waste reduction and other organisational environmental and social practices, into performance objectives and measure whether the results match the objectives with the help of an integrated system. Those firms that go through internal audits, benchmarking and feasibility studies know that determining a solution to environmental (and other social) problems is difficult and may be resource-intensive. Managing in this complex business environment with increasingly integrated and pervasive systems is an issue that needs to be brought to the forefront.

There has been a practical response to the shifting focus and requirements of EMS. In a number of organisations, environmental managers have been asked to take on additional duties such as social responsibility management (e.g. making sure that products are not produced with child labour, that decent wages are paid and equity issues addressed) and security issues (safety of workers, product safety, contingency planning and emergency response). Thus, EMSs need to be designed to take into account these new responsibilities.

This book aims to provide academic and practitioner insight into environmental business practices and, specifically, strategic and sustainable EMSs. The topic will be of interest to managers faced with decisions regarding their own EMS and environmental practices as well as to researchers seeking additional insights for theoretical development and testing. In situations where environmental projects may be thought of as simply the 'cost of doing business', the chapters in this book provide evidence of benefits that exceed the costs (tangible and otherwise) in order to help practitioners under-

stand the attributes of well-developed and strategically focused EMSs. The information provided herein also demonstrates the link to performance measures such as reputation, improved position in the marketplace, cost, quality, waste reduction and numerous sustainable development-based metrics and issues. The scope of topics span several industries and provide environmental systems insight involving sustainable management systems, strategic and operational impacts of environmental systems, cross-country comparisons of EMS design processes and results, product-based environmental systems, EMS impacts in innovative organisations, including environmental systems integration within specific industries.

These issues provide the foundation for this book. The chapters fall into three categories. The first five discuss the broad issues of planning and designing an EMS, including topics such as performance evaluation, comparisons of multinationals' environmental systems, sustainable development and links between established quality systems and EMSs. The second category of chapters comprises slightly more targeted papers, yet still provides insights for general practice and research. This second category focuses on EMS implementation and operation while including some corporate or industry-specific case studies. Five chapters with a good breadth of methodologies and industries cover the interests of a wide variety of audiences. This section of the book includes information regarding a product-based EMS, environmental reporting and the use of the internet to facilitate environmental management, sustainable practices within the utilities industry and an airport. The third and final category of this book highlights the use of an EMS to evaluate business processes. The four chapters within this section first explore the factors influencing implementation before comparing systems in the US and Thailand and discussing the challenges of change management and sustainable development. The final chapter ties together EMSs and looks at their impacts on firm performance.

The first chapter, by Cagno, Tardini and Trucco, stresses the importance of performance measurement before comparing and contrasting several performance indicator models with ISO 14031. Next, the authors assess the factors involved in performance measurement (e.g. corporate policy, organisational structure, cross-functional integration, communication, training, etc.) before developing an environmental performance indicator database and environmental performance evaluation system. The authors then go on to illustrate their approach to performance measurement and management with examples at the Coca-Cola Italy and Nestlé Italy before going on to highlight some of the advantages firms may realise when integrating the suggested environmental performance evaluation system and environmental indicators.

Chapter 2 by Christini, Matthews and Hendrickson looks for common components among environmental systems. The authors do this through a multi-method approach to data collection at several multinational firms. With the assumption that all firms have some sort of EMS in place, the researchers find several common elements to a formal EMS and conclude that the presence of these elements indicates a basic structure for environmental systems. The authors also show that unique elements do exist, such as detailed process maps to identify environmental issues, collaboration among environmental professionals and tools to assess risk of potential future issues. Environmental personnel see the EMS as valuable, although improvement is needed through additional communication of EMS results beyond the environment, health and safety function of the company.

The third chapter, by Oktem, Lewis, Donovan, Hagan and Pace, considers sustainability and system integration through the lens of qualitative analysis involving several case studies from a variety of organisations. The case studies provide insight on how some firms approach strategic-level decision-making and highlight the ability of these firms to look beyond short-term cost/benefits in order to realise long-term environmental and financial gains. The chapter provides a comparative analysis of the case studies based on five business organisational components including development of business cases, organisational issues, operational issues, information technology issues, and monitoring and auditing concerns. How organisations addressed these various components provides an insightful comparative analysis from a variety of industries.

The authors of Chapter 4, McElhaney, Toffel and Hill, report on BMW's sustainable management system (SMS). Even though comparable to the previous chapter, BMW's SMS incorporates different measures and has a different development process. This case study describes how an industrial design company developed a SMS standard, and designed and implemented the system throughout its business while becoming the first company to achieve third-party SMS certification. The design broadens the goals and objectives of traditional EMSS by focusing on critical social attributes. It therefore represents an important evolutionary step from operational EMS to strategic SMS.

The final chapter in the planning and design section of this book, by Hanson, Melnyk and Calantone, empirically examines, at the operational level of analysis, competing models involving common practices across manufacturing firms in the US to see how well these transcend total quality management (TQM) initiatives and environmentally responsible manufacturing (ERM) initiatives, both of which have been targeted as critical to sustainable EMS development and management. Assessing competing models, the authors conclude that new and better models are still needed and that success in implementing TQM does not necessarily mean successful implementation of an ERM initiative. This is an important finding since many EMS systems are based on TQM principles of continuous improvement and closed-loop management principles. It is suggested that having top-management support is a dominant and critical factor for successful systems implementation.

The implementation of an EMS is a discretionary process; EMSS may differ in their scope, priorities, substance, objectives and targets, design process and other characteristics. These differences produce variations in environmental performance and other management outcomes. The second section of this book looks at the implementation and operation of EMSS. The first chapter in this section, by Donnelly, Saleminck, Blechinger, Schuh and Boehm, a management team within a large multinational firm, discusses the process used by the authors to develop and implement a product-based EMS (PBEMS). Unlike traditional EMSS which tend to focus solely on local environment issues, a PBEMS is used early in a product's design process to prevent environmental issues from becoming problems later in the life-cycle. In this chapter, the authors discuss the obstacles to the system's development and how they received support and buy-in. They offer a unique insight into how other management teams could go about developing a similar system to act as a decision support tool involving the specific environmental characteristics of products and their life-cycle analysis. Additional insights revealed by the authors include not forcing new systems on the business but instead integrating the PBEMS with already familiar and established processes (so

reducing the need for radical change), engaging stakeholders while building good relationships with them and having access to local technical expertise and support.

In Chapter 7, Isenmann and Bey uncover issues surrounding environmental reporting media. Reporting includes internal reporting (e.g. workflow), underlying core processes (i.e. preparation, administration, distribution and presentation) and external reporting. The authors discuss the importance of internet-based reporting and the need for robust information and communication technology and strategy. A literature review posits many technical benefits and possible realisations of internet-based technology and systems. A framework for advanced environmental reporting becomes the foundation for detailing a proposed information and communication technology architecture, with the end result being sustainable reporting. Increasing demands for good environmental performance and practices leads to an expanded use of the World Wide Web to facilitate EMS for smaller firms. Thus, the next chapter, by Maijala, Linnanen and Pohjola, reveals that small and medium-sized enterprises (SMEs) need a reliable means of managing environmental issues. The importance of this is magnified when one thinks about the significant number of SMEs in the EU. The case study presented in this chapter involves the development of a web-based tool, EcoTra, aimed at integrating environmental considerations into the decision-making processes of companies. The tool is specifically developed for transportation SMEs and should enable them to identify, analyse, manage and report environmental factors related to financial functions. The authors identify barriers to EMSs for small firms and use the web to break through some of these barriers in order to establish an EMS tool. A discussion of EcoTra's parameters, performance indicators and training then lead into the benefits of this tool.

Chapter 9 by DeBono takes readers out of the context of a typical manufacturing environment and into a power-generating facility. This is a dynamic industrial setting involving macro-socioeconomic pressures, such as deregulation, and growing external uncertainty surrounding impacts on climate change, new environmental regulations and a consumer base requiring ever safer and cleaner energy. While companies have their own unique set of environmental, economic and social issues to address, the business drivers and steps used to integrate environmental management and sustainability practices into this firm's operations are comparable to other industries and so managers from other sectors can benefit from information presented here. Benefits from a sustainable development programme and EMS integration include the reduction of environmental impacts and improved compliance while also bringing about more integrated partnerships, employee commitment and reduced liability.

The final chapter in the implementation and operation section of this book, by Raftopoulou, Kavouras and Karamanos, provides a unique organisational environment for environmental systems development and integration with a case study of Athens International Airport. Within this context, the authors discuss the design, development and implementation of a third party-certified EMS, but go beyond a typical EMS to incorporate two unique elements: the management of historical and cultural heritage aspects. Lessons are provided that explain how this process of integrating a wide variety of metrics—going beyond greening—into an EMS became one of the core goals of this organisation. Benefits and lessons learned from this case study provide insight for non-manufacturing industry settings.

The use of an EMS for evaluation and performance improvement is examined in the final four chapters. The first, by Weber, looks at the factors influencing the implementation of an EMS. A number of research questions are addressed to help advance our understanding of management systems. Specific questions include:

- Why do firms implement and certify environmental management systems such as ISO 14000 or the EU Eco-Management and Audit Scheme?
- What are the main impacts influencing firms' implementation of a certified EMS?
- What is the relation between an EMS and the implementation of environmental management practices?

Through the use of empirical data from a survey, analysis shows that the most influential factors were self-commitment and business management, suggesting that implementing environmental management practices is motivated by the willingness of management to implement an EMS and by the assumption that it 'pays to be green'. Weber goes on to say that external pressure to certify an EMS should not be the primary driver for this decision and that internal influences are more important.

In Chapter 13, Gallagher, Andrews, Chandrachai and Rohitratana utilise a comparison of EMS implementation experiences across four industrial facilities in the US and Thailand. The chapter illustrates the variation in EMSs and examines the similarities and differences in environmental and other outcomes that result. Significant differences among the four facilities' EMSs suggest that the fact that a facility has an ISO-equivalent or even ISO-certified EMS does not mean the EMSs are similar, despite their common framework and procedure. It is the content of the EMS objectives and targets, and the actual results of their implementation that matter, rather than certification per se.

Chapter 14 looks into the difficult issues surrounding change and sustainable development. Here, Callinan gives a brief review of corporate environmental management with respect to sustainable development. From this starting point, specific EMS needs are identified and potential augmentations presented through the lens of change management. A model for an enhanced EMS is then described and its trial at a case study organisation is presented. Managing the transition towards sustainable development by incorporating change management capacities (systematic education, cultural development and problem-solving) into a conventional EMS is shown to have potential as a method by which organisations can pursue sustainable development.

In the final chapter, empirical research by Ammenberg reviews relevant literature regarding relationships between standardised EMSs and the environment. A review of previous empirical studies demonstrates a gap in the literature and practice regarding how EMS standards are interpreted and applied in many firms. The author concludes that a majority of the findings indicate that EMSs have, until now, have been primarily facility-oriented. This means that most environmental aspects are focused on sites and that only a limited part of the EMS procedures and activities are directed towards the value chain upstream or downstream from a company.

We hope this book offers readers insight into a growing field of knowledge involving EMSs and SMSs. Taken together, the chapters in this book review a wide variety of industries and the concerns they face. A meta-analysis of the various chapters can provide

insights to managers, policy-makers and researchers. As we noted earlier, EMS debates have been occurring for nearly a decade. We see this book as an important step in clearing the path for a larger dynamic picture of environmental systems as they develop and emerge from 'necessary evils' to important strategic elements. Our goal when developing this book was to have a balance of practical learning and theoretical reflection that will continue to propel firms towards continuous evolution of all systems from operational-level EMSs to those that support and further develop the strategic direction of organisations.

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