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# Motivation for ISO 14000 certification: development of a predictive model

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## Abstract

Environmental issues have become critical concerns of businesses in recent years. The Singapore Environment Ministry is urging organizations to consider adopting the ISO 14000 Environmental Management Standards. The main purpose of this study was to investigate and identify a number of variables which would be able to predict the motivation of organizations in adopting the ISO 14000 Standards. Through extensive literature search eight possible predictive variables/factors (cost savings, top management concern, employee welfare, meeting environmental regulations, meeting customer expectations, concern over trade barriers, following head office environmental practices, and gaining competitive advantages) were identified. In total, 300 pre-tested survey questionnaires were mailed out to companies from the Electronic and Chemical industries in Singapore. A response rate of about 20% was obtained. The survey instrument was tested for reliability and validity. Using stepwise discriminant analysis, a predictive discriminant function was developed. Only four out of the originally identified eight variables were included in the model. Possible benefits of such a model for Singapore and other industrializing countries are highlighted. © 2001 Elsevier Science Ltd. All rights reserved.

**Keywords:** Environmental management system (EMS); Predictive model development; Discriminant analysis; ISO 14000 standard; Singapore; Electronics industry; Chemical industry

## 1. Introduction

An enduring society must be based on a system of commerce and production that is sustainable and restorative [1]. Sustainable development is an approach that uses the earth resources in such a way that future generations' needs are not compromised. In other words, sustainable development seeks a balance between economic growth and environmental protection. This implies that countries and businesses need to integrate economic, biologic, and human systems to

create a sustainable system of commerce, and that governments need to incorporate flexibility that rewards proactive environmental management. As we approach the 21st century, it is clear that new ways of thinking are needed to tackle the environmental and societal issues that face our global community. The consequences of not managing the organizational environment properly may result in severe pollution and other related problems, which may kill thousands of people and damage the physical environment [2]. For example, in the last quarter of century there were a number of large-scale industrial disasters which spurred global concerns about industry's impact on the environment and motivated the international community to consider new ways of preventing pollution. Events such as the chemical disaster in Bhopal, India, the radiation release in Chernobyl, USSR,

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the oil spilled by Exxon Valdez off the coast of Alaska, the fire at a warehouse of a chemical manufacturer at Basel, Switzerland, and many others [2–4] raised global concerns about industry's impact on the environment and generated global interest in preventing pollution [5].

Environmental management attracted interest only in the 1970s. For example, the first European Community Directive pertaining to the disposal of waste oil was issued in 1975. This was followed by subsequent directives covering toxic waste, dangerous waste, titanium oxide and pollution of water and air [6]. Following the 1980 Earth Day, the publication of the United Nations' Brundtland Report in 1987, highlighted that though economic growth has been the cause of much environmental damage, economic development is necessary to remove poverty. The report further suggested the adoption of sustainable development as a solution to attain both economic and environmental goals [4]. This triggered a philosophical change from the "anti-growth" perspective of the 1970's environmentalists to one of "sustainable development" [7]. As a result of the Brundtland report, the Earth Summit in June 1992 (also known as the United Nations Conference on Environment and Development) was held in Rio de Janeiro and was attended by heads of states and leaders of 170 nations [6]. The Earth Summit covered areas such as biological diversity, climate change and a detailed blueprint for implementing sustainable development based on 27 principles known as the Rio Declaration [7]. Furthermore, environmental standards were prepared in order to guide businesses in their efforts to set up environmental management systems and also to provide an objective measure to determine the appropriateness of the different environmental management systems set up by business enterprises [5].

Besides governmental efforts in environmental management, businesses are also starting to focus on environmental issues. For instance, the Business Council for Sustainable Development (BCSD) was established in 1991 with a total of 48 members. Its main mission was to provide a business input during the Rio Conference. Its members are heads of major global companies like Dow, Dupont, Ciba-Geigy, Shell, Chevron, Trans Alta Utilities, Nippon Steel, ALCOA, Volkswagen and Nissan. The principle of eco-efficiency, which describes the practice of adding most value with the least use of resources and the least pollution, was developed. Based on this principle, BCSD believes that corporate environmentalism will lead to competitive advantage and increasing profitability [8]. Codes of environmental behavior for businesses have also been developed in recent years, most notably, the Coalition for Environmentally Responsible Economies (CERES) Principles and the Business Charter for Sustainable Development (BCSD). With the Exxon Valdez oil spill incident as the triggering effect, the CERES principles were released in 1989. The CERES principles promote responsible economic activity for a safe, just and sustainable future. Signatories to the CERES principles include companies like the Sun Mi-

croSystem, General Motors and Ben & Jerry's [9]. In 1990 the International Chamber of Commerce also developed a set of 16 guiding principles known as the Business Charter for Sustainable Development or the Global Environmental Management Initiative (GEMI) Principles [10] and over 1000 companies have since endorsed the charter [9].

A number of empirical studies have also concluded that adopting environmental management does bring certain advantages for businesses. For instance, Klassen and Whybark [11] concluded that improved manufacturing performance could occur simultaneously with investments that improve environmental performance; Russo and Fouts [12] confirmed that high levels of environmental performance were associated with enhanced profitability. Furthermore, they also concluded that as industry grows, environmental performance would have a greater positive impact on firm profitability. Klassen and McLaughlin [13] concluded that both environmental performance and firm performance are positively linked. Finally, Sharma and Vredenburg [14] concluded that proactive measures in environmental responsiveness is associated with the emergence of organizational capabilities and that had no negative impact on corporate competitiveness [5].

Companies are realizing that proactive environmental management can prevent such disasters and result in a more effective organization with an improved bottom line. The best-managed companies have demonstrated that implementing an environmental management system can produce significant increases in productivity and profitability [15].

### 1.1. What is ISO 14000?

The ISO 14000 standards are international voluntary, consensus standards [2]. These standards were developed by the International Organization for Standardization (ISO), located in Geneva, Switzerland, is a non-governmental, international organization. The goal of the ISO is to develop standards on a worldwide basis to allow commerce to transcend national boundaries without creating trade barriers. The standards are process oriented; they do not establish goals or limits. Instead, they establish management system guidelines that help organizations ensure compliance with customer, industry, or regulatory limits.

The early 1990s saw developments in the area of Environmental Management Systems (EMS). BS7750, the British Standards for EMS was introduced in 1992, and revised in 1994. Concurrently, the work on the European Union's environmental standard for companies began, and led to the launch of the Eco-Management and Audit Scheme (EMAS) in 1993 [2,16].

In 1993, the ISO established a Technical Committee (TC207) to develop and produce a set of unified, voluntary standards for environmental management that could be accepted and implemented worldwide. ISO 14000 has been developed to help any company in any country to meet the goal of "sustainable development" and environmental

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