

ECONOMIC AND SOCIAL COMMISSION FOR WESTERN ASIA

**IMPACT OF THE APPLICATION OF ISO 9000 AND ISO 14000
ON SELECTED INDUSTRIAL SECTORS:
CASE STUDIES**

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CONTENTS

	<i>Page</i>
Overview	v
<i>Chapter</i>	
I. INTRODUCTION TO ISO 9000: 2000 AND ISO 14000	1
A. Quality Management Standard ISO 9000: 2000	1
B. Environmental management standard ISO 14000	12
C. Opportunities and limitations in the integration of ISO 9000 and 14000	21
II. CASE STUDIES	24
A. Lebanon: Malia Holding	24
B. Jordan: the impact of ISO 9000 certification	26
C. The Syrian Arab Republic: the impact of ISO 9000 certification	27
III. HOW FAR HAVE UN-ESCWA MEMBER COUNTRIES COME IN TERMS OF ISO 9000: 2000 AND ISO 14000?	30
IV. RECOMMENDATIONS	31

LIST OF TABLES

1. A model of the relationship of items in profit and loss statements and expenses and profits of ISO 9000 certification	9
2. Estimated expenses of certification and maintenance (An electric division in company A)	10

LIST OF FIGURES

I. An example of the business process approach	4
II. ISO categories and related standards	13
III. EMS principles and auditors' involvement	14
IV. COSO provisions in an EMS	15
<i>Bibliography</i>	<i>32</i>

Overview

The aims of this study are to facilitate international and regional trade for industries in the ESCWA region.

(a) By encouraging manufacturing companies to certify to ISO 9000: 2000 and ISO 14000 and, more generally, to be compatible with international requirements, thus enhancing the competitiveness of goods and services;

(b) By clarifying the issues surrounding the acceptability and adoption of the ISO quality and environment standards and the recognition of certificates issued by national bodies;

(c) By promoting at reasonable cost the development of those aspects of infrastructure concerned with certification and accreditation, including the training of qualified consultants.

The ISO 9000 series of quality management standards, first published by the International Organization for Standardization (ISO) in 1987, was a system for optimizing the quality effectiveness of an organization. ISO 9001 was intended for organizations that needed to assure their customers that conformity to specific requirements was being met throughout the whole cycle from design to service. ISO 9002 was used as a benchmark for production and installation capabilities for companies that did not undertake the design stage of the manufacturing process. ISO 9003 was a benchmark for inspection and testing capabilities where a manufacturer supplied products for these purposes. An organization requiring certification to one of these standards for marketing, contractual or regulatory purposes would initially achieve third-party registration/certification to ISO 9001, ISO 9002 or ISO 9003 and then (hopefully) full certification, when it had attained 100 per cent implementation of ISO 9004, the quality management model. ISO 9000-1 and ISO 9004-1 acted as guides in implementation and ISO 8402 as a guide to the terminology.

ISO 9000 was revised in 1994 and then again significantly in 2000, and though the benefits remain very similar, ISO 9000: 2000 includes major changes. Since ISO certification expires every three years, ISO 9000: 2000 will require organizations certified to ISO 9000 to update their current quality systems. It will also change the ground rules for companies seeking ISO certification from now on.

The ISO 14000 series of environmental management standards, developed by the ISO in 1996, was the first globally recognized set of guidelines for voluntary environmental management. The series is a set of generic tools for developing, implementing, maintaining and evaluating environmental policies and objectives. The series contains standards for environmental management systems, environmental auditing, life-cycle assessment, environmental labelling and environmental performance evaluation. The worldwide impact of the ISO 14000 environmental standards is expected to transcend that of the ISO 9000 quality standards. In fact, ISO 14000 may eventually become a requirement for obtaining recertification to ISO 9001 (Rezaee 2000).

This study has three main parts. Chapter I covers the most recent versions of the ISO 9000 and 14000, together with the information companies need in order to make informed decisions regarding planning, implementation and maintenance of certification to these standards. Chapter II reviews case studies related to ISO certification in Lebanon, the Syrian Arab Republic and Jordan, three countries in the ESCWA region. For Jordan, this study presents a summary of a report by the Jordanian Institution for Standards and Metrology entitled 'Impact of the Application of the ISO 9000 Standards on the Performance and Competivity for Jordanian Enterprises'. For Lebanon, the case of Malia Holding is outlined as a situation representative of the barriers to and benefits of ISO certification. For the Syrian Arab Republic, a survey summary is included. Chapter III outlines how far ISO certification has penetrated the ESCWA region and concludes that the Middle East and Africa are still a way behind Europe, though they are experiencing a huge growth in number of certifications. Finally, chapter IV offers some recommendations for reaching the aims noted above.

I. INTRODUCTION TO ISO 9000: 2000 and ISO 14000

A. QUALITY MANAGEMENT STANDARD ISO 9000: 2000

1. Introduction

At the end of 2000, the International Organization for Standardization (ISO) announced revised versions of ISO 9000 which deals with quality management systems (QMSs). The changes had recently been approved by an overwhelming majority of voting members. The revised versions are as follows.

- (a) ISO 9000: 2000, Quality Management Systems - Fundamentals and Vocabulary;
- (b) ISO 9001: 2000, Quality Management Systems - Requirements;
- (c) ISO 9004: 2000, Quality Management Systems - Guidelines for Performance.

While certification to the new version is not required until 2003, the changes in structure and content of the new series are significant. The changes are ultimately based on eight proven quality management principles: customer satisfaction; leadership; the involvement of people; the business-process approach; a systematic approach to management; continual improvement; a pragmatic approach to decision-making; and mutually beneficial relationships with suppliers. The new version requires QMSs certified to the previous version of ISO 9000 to be reviewed and modified. The new standard emphasizes continual improvement, communication and customer satisfaction, and Zuckerman recommends the setting up of a customer-satisfaction index to achieve these ends (Zuckerman 2001).

There are three significant structural changes in ISO 9000: 2000. Firstly, the standard is now structured in theory around the Deming loop (the 'plan – do – check – act' or PDCA model), one practical implication being that ISO 9000: 2000 is now structured in a similar way to ISO 14000 and other health and safety standards. Secondly, ISO 9004 becomes a standard guide for quality improvement, not just a guideline to ISO 9001. Thirdly, ISO 9001 will be the only certifiable standard, i.e., ISO 9002 will no longer exist. The intention is that instead of attaining certification to ISO 9002, all companies will seek certification to ISO 9001, albeit with 'permissible exclusions' (i.e., the exclusion of clauses not deemed applicable). Exclusions are only permitted from clauses within Section 7 of the standard (which relates to process management). Jack West (chairman of the US Technical Advisory Group to ISO Technical Committee 176) has said of this third change: 'The requirements of ISO 9001: 2000 maintain a greater focus on customer satisfaction, user needs and continual improvement of the quality management systems than the 1994 version. The revised standard also shifts the requirements away from previously used manufacturing oriented terminology and simplifies requirements for quality management system documentation. ISO 9001: 2000 is now the standard against which quality management systems are certified.' (Anon., February 2001).

Major companies, from Hewlett-Packard to Corning and IBM, are moving ahead with the revision of their ISO 9000 processes, even though they have three years from the date on which the new series of standards was officially approved (14 December 2000) to register to the new standards (Zuckerman 2001). Reg Blake (vice president of operations for the British Standards Institute (BSI) US operation) believes the new version should prove far more useful to companies both large and small than the previous version, which focused more on consistency and measurement and less on process (Zuckerman 2001). Registrars will need to become familiar with the workings of their client companies, their corporate culture, work flow, and internal processes. Blake recommends that both companies and registrars adjust to the new version. The new testing requirements will offer companies guidelines for changes they may have to make in their management systems (Zuckerman 2001). Few, if any, companies will have to reearn a certificate from scratch. As Blake says: 'No one is asking anyone to reinvent the wheel ... Companies won't have to reearn an entire certificate. There may be some additional work' (Zuckerman 2001).

Blake points out that companies that will have the most problem with the new standard are those that do not have mature quality systems in place and have not focused on building continual improvement into their daily business. These companies can begin remedying the situation immediately by examining how they are complying with ISO 9000. If a company has earned ISO 9000 for (what Blake calls) the wrong reasons ('to pass a test') it is time for that company to look at the total-quality-management aspect of the

standard, how its ISO 9000 work is organized and how employees are involved in this process (Zuckerman 2001). Teams that involve all employees should be set up, a communication structure that promotes input from the bottom up in the organization should be in place, and there should be a free-flowing documentation system.

Despite all the changes in the new version of ISO 9000, Blake does not expect that companies will 'make significant changes to existing ISO 9000 processes', and the basic concerns that the standard is designed to address remain the same, i.e., that companies' channels of communication should remain open and that procedures to ensure quality and customer satisfaction be better monitored. Companies are hoping that the new version of the standard will mean 'less maintenance of reduced documentation; increased compatibility with the business model, which uses templates as the Baldrige Performance Excellence Criteria; linkage to business results; increased such focus on improvement action to the ISO processes; and stronger linkage to management with more rigorous reviews of data collected by the ISO Systems (Zuckerman 2001).

2. Differences in documentation

The 1994 and 2000 revisions of ISO 9000 offer different models for quality. ISO 9000: 1994 defines quality around 20 key considerations for effective and consistent production and services, the primary purpose being to assure customers that the ISO-certified company produces products at a consistent level of quality. In place of these 20 considerations, ISO 9000: 2000 is based on a process model of four parts: management responsibility; resource management; product realization; and measurement, analysis and improvement. Other sections of the standard provide background, while the section on QMSs acts as a preamble to the process model itself, describing an organization's obligation to establish a documented QMS. The four sections in the standard relating to the process model contain all the requirements for ISO 9000: 2000, stated in more generic, less prescriptive terms than the 1994 20-part model. Though the new model is simpler than its predecessor, the requirements represent a quantum leap in several areas, which are as follows.

(a) Voice of the customer

An organization will need to put in place methods to describe and monitor the needs and desires of each customer relating to each order, as well as processes and procedures to measure and analyze customer satisfaction. Critics have long complained that a company could make 'concrete life preservers' and still be certified to ISO 9000. ISO 9000: 2000 helps put that criticism to rest.

(b) Continual improvement

Under ISO 9000: 2000, it will not be sufficient for an organization simply to measure customer satisfaction. The organization will need to improve the level of customer satisfaction and quantify and improve the relevant internal processes.

(c) Management responsibility

Executive management plays a far more central role with the new standard. In ISO 9000: 2000 the role of management is expanded so that management presides over a five-step version of the PDCA model.

- (i) Step 1: Policy. An organization's management is obliged to establish a policy that incorporates a commitment to continual improvement and meeting customer requirements;
- (ii) Step 2: Objectives. A framework must be established for reviewing quality objectives, which are set 'at relevant functions and levels within the organization';
- (iii) Step 3: Planning. Planning identifies the activities and resources necessary for achieving objectives;

- (iv) Step 4: Quality Management System. An organization's management must establish a QMS as a means of implementing the quality policy and its associated objectives and plans, as well as the requirements of the ISO standard;
- (v) Step 5: Management Review. Emphasis on this process is increased in ISO 9000: 2000, and the standard covers topics ranging from drawing up management policy to management review with continual improvement as the output. It is similar to the way the PDCA model outlined in the environmental management standard ISO 14001, thereby allowing organizations to develop complementary systems for the two standards.

(d) *Resource management*

This section of ISO 9000: 2000 spells out a wide range of necessary resources, including the human resources that management must provide or make available, e.g., adequate numbers of competent workers, training, infrastructure, suppliers and partners, financial resources, and a safe, clean and ergonomically friendly work environment.

Where does the new standard leave organizations that are certified to the previous version of ISO 9000? The good news is that every element of the previous version can be mapped onto the new ISO 9001. Furthermore, the written procedures required by the new version need not change the familiar four-tier pyramid structure for documentation, although it can be simplified—the policy manual and first-tier procedures can be combined. An organization's current ISO system can thus be the foundation for its successor. However, much existing documentation may need to be remapped and expanded to meet the requirements of ISO 9000: 2000; in many cases these revisions can be substantial. Twelve elements of ISO 9000: 1994 have been reduced to sub-clauses in ISO 9000: 2000. The ISO Group provides a table of the differences in the documentation structure (at http://www.isogroup.simplenet.com/free_9k/90012000.htm, status at September 2001).

DIFFERENCES IN THE DOCUMENTATION STRUCTURE OF ISO 9000: 2000 AND ISO 9000:1994

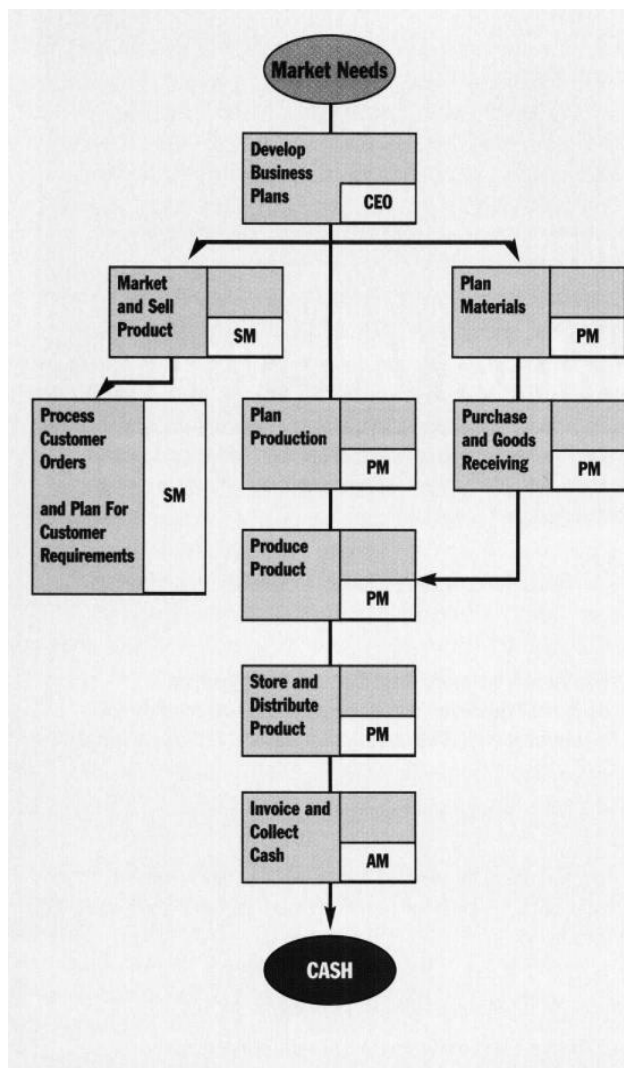
ISO 9001: 2000	ISO 9001: 1994
5.0 Management responsibility 5.1 General 5.2 Customer needs and requirements** 5.3 Quality policy 5.4 Quality objectives and planning 5.5 Quality management system 5.6 Management review	4.1 Management responsibility 4.2 Quality system 4.5 Document and data control 4.16 Quality records
6.0 Resource management 6.1 General 6.2 Human resources** (including training) 6.3 Other resources (including information**, infrastructure** and work environment)	4.1 Management responsibility 4.9 Process control 4.18 Training
7 Process management 7.1 General** 7.2 Customer-related** (including needs and expectations**, review of needs (etc.)**, ability to meet needs, customer communications**) 7.3 Design and development (including design and development, product and service validation/verification**, configuration management, purchasing, production/service operations, identification and traceability, control of process operations, handling and storage (etc.), validation of processes**) 7.6 Control of non-conforming product 7.7 Post-delivery**	4.3 Contract review 4.4 Design control 4.6 Purchasing 4.7 Control of customer-supplied product 4.8 Product identification and traceability 4.9 Process control 4.10 Inspection and testing 4.12 Inspection and test records 4.13 Control of non-conforming goods 4.14 Corrective and preventive action 4.15 Handling, storage, etc. 4.19 Servicing

ISO 9001: 2000	ISO 9001: 1994
8.0 Measurement, analysis and improvement	4.1 Management responsibility
8.1 General measurement (including system performance**, customer satisfaction**, internal audits, process measures, product measures, inspection and test records, control of test, measurement, inspection equipment)	4.10 Inspection and testing
8.3 Analysis of data	4.11 Control of inspection, measuring, test equipment
8.4 Improvement (including corrective action, preventive action, improvement processes)	4.17 Internal quality audit
	4.20 Statistical techniques

** New material, expanded requirements, or additional explanation introduced.

3. The new business-process approach

Figure I. An example of the business process approach



ISO 9000: 2000 entails a new business-process approach, and one of the key changes relates to requirements for a company to identify, control and measure its core and support business processes. An example of the business-process approach for a generic tile plant is given in figure I. One of the key decisions for determining a business-process is which processes should be included; the diagram suggests that activities such as business planning and invoicing should be among those included. As far as ISO 9001 is concerned, determination of a business approach is, to a degree, up to the individual company. Many companies are reluctant to include areas not specifically required by the standard, often thinking that the less there is for the auditor to look at, the fewer problems there will be. However, this approach excludes critical areas of business performance from the continual improvement process. It is far better to work with the certification body to draw up an audit program that excludes these areas from third-party audit but leaves them as an integral part of the company's system.

The increased emphasis in the standard on compliance with legal and regulatory issues means that there is less flexibility when it comes to including or excluding the design function within an organization, and it is no longer acceptable to exclude the design function from a company where true design and development are conducted.

For example, some industries, particularly in the whitewares sector, may have excluded the design function under their current certification. However, if product design affects the company's ability to meet regulatory requirements, the design function will need to be brought back into the QMS to meet the requirements of ISO 9000: 2000 (Cargill 2001).

The traditional quality manual centres on the 20 clauses of ISO 9001: 1994, typically providing a brief description of how each clause is met. A company can attain certification to ISO 9000: 2000 by making a number of updates to a currently approved quality manual (Cargill 2001). However, given the likely long-term direction of much of the industry toward environmental management systems (EMSs), it would be a wise investment to consider rewriting the manual, providing a brief overview of each of the core and support business processes of ISO 9000: 2000. Such a structure provides an ideal framework for integration with other manuals. By including an appropriate cross-referencing system and policy statement for each new standard covered, the need for separate manuals would disappear. Although this approach creates more work in the short term, it should save a considerable amount of time in the long term.

Previous versions of ISO 9000 required a documented procedure for the activities of individual departments (Cargill 2001). ISO 9000: 2000 focuses on the cross-functional business processes that deliver products to clients, with the formal requirements for documented procedures significantly reduced and replaced with a more flexible and pragmatic approach. Any one process can now be examined in more detail, with inputs defined through consideration of the outputs the process should achieve.

Control, one of the key requirements of ISO 9000: 2000, is achieved by an appropriate balance of procedures or methods; the competence of personnel; equipment and facilities; and rules and regulations (Cargill 2001). Demonstrating to third-party auditors that documented procedures are not required is best achieved by comparing the results of a process against the objectives set. While this allows considerable flexibility to an individual company, it will require a significant change in the approach of most auditors. A company is free to adjust the balance away from paperwork if its process is supplemented by appropriate improvements in other areas. (For example, many companies have invested in new sales order processing systems that will not allow an order to be placed unless all critical information is supplied. By its very nature, provided that personnel are trained in use, this type of system has little need for a documented procedure.) Control also means that core and support processes are required to have some quantifiable measure of performance, and that business processes are required to meet objectives or targets and also to be subject to continual improvement.

The current text of ISO 9001: 2000 clearly states that 'procedures may be in any form, type or medium'. This is not a change, rather an increase in emphasis (Cargill 2001). It can offer significant reductions in administration for larger multi-sited companies. Reductions in administration costs can readily be achieved in document control. Storing procedures on an intranet, with general read-only access, can eliminate the bureaucracy of change control. Authorization can be conducted electronically, with multiple-user approval via e-mail. This makes better use of the recent and ongoing investment in information technology that we see in many companies. More radically, many new software packages facilitate direct uploading to internal or external websites, putting procedures into easy to understand flowcharts and allowing links to multimedia solutions such as pictures, diagrams or video clips. When published on external websites, such information can be readily accessed from anywhere in the world. Again, this move away from traditional documentation requires a different approach to that offered by many of today's third-party auditors.

The focus on improvement and effective implementation of the business-process approach requires that critical core and support processes be identified; that effective measures for process performance and objectives to measure process performance be established; and that the objectives of the quality policy be linked to the requirement for continual improvement (Cargill 2001). As such, the quality system is based on what is critical to the business. Likewise, third party-audits should follow this approach and become focused on business objectives. However, this will only work if new systems have been correctly implemented and are correctly audited, particularly during a transition period (Cargill 2001).

4. ISO 9004 and performance improvement

ISO 9000: 2000, ISO 9001: 2000 and ISO 9004: 2000 together constitute an effective guide to QMSs that may be understood by all parties (Babicz 2001). For some, the requirements spelled out in ISO 9001: 2000 can provide building blocks for companies wanting to implement and operate effective QMSs. However, it is ISO 9004: 2000 – commonly referred to as the second half of the ‘consistent pair’ – that provides the guidelines necessary to flesh out QMSs (Babicz 2001). Kathy Roberts is president of Sunrise Consulting Inc. (Raleigh, NC) and a member of the US Technical Advisory Group to Technical Committee 176, the body responsible for developing the ISO 9000: 2000 standard. She states that ‘ISO 9004 is an excellent business management tool to use when companies want to go above and beyond the foundational elements of 9001’ (Babicz 2001).

Because the ISO 9000: 2000 standards represent a major advance on those of ISO 9000: 1994 that they replace, many organizations to date have been concentrating on interpreting and implementing the requirements of ISO 9001: 2000, leaving the ISO 9004: 2000 guidelines on the shelf collecting dust. Arlen Chapman (quality systems director of National Quality Assurance (NQA), USA Inc. (Acton, MA)) says: ‘I think at this point, 9004 is a new document and people are focused on 9001, the basic requirements, and they haven’t gotten to the guidance document yet.’ (Babicz 2001). Kathy Roberts says that one of the first things a company can do is to study the self-assessment suggestions made in the annex to ISO 9004: 2000 to determine where it stands in relation to the ISO 9004: 2000 guidelines. ‘Depending on how they score themselves, they can use the components of 9004 to make improvements based on where their gaps are’ (Babicz 2001). Most experts agree that ISO 9004: 2000 is user-friendly and easy to read. For example, ISO 9001: 2000 says that an organization must provide a work environment that achieves conformity to product requirements. ISO 9004: 2000 takes a further step and states what may contribute to such a work environment, such as safety rules, ergonomics, location of the work place and social interaction (Babicz 2001).

One major question arising from the ISO 9001: 2000 standard is exactly what is meant by the term ‘continual improvement’. ISO 9004: 2000 can help here. Mike Delpha is vice-president of consulting services for Prism eSolutions (Blue Bell, PA, USA), a provider of process improvement tools and solutions. He says: ‘9004 provides suggestions for sources of information to look at when considering continual improvement ... There are 10 examples of sources of information for people to research to drive continual improvement into the company. So it takes it from an amorphous phrase and breaks it down into practical sources of actions to consider’ (Babicz 2001).

Another area in which ISO 9004: 2000 provides direction is management responsibility. The new version of the standard is much harder on management than the 1994 version. Delpha points out that ISO 9004: 2000 clarifies some of the practical issues that management need to consider and act on in order to satisfy the requirements (Babicz 2001). For example, 9001: 2000 says that management must review the QMS periodically, and ISO 9004: 2000 provides 13 specific things that management may consider as part of the agenda when conducting such a review. The list includes the results of audits and self-assessment of the organization and the results of benchmarking activities, as well as the performance of suppliers and new opportunities for improvement (Babicz 2001). Many in industry expect to see a growing role for ISO 9004: 2000 as companies look to boost process performance (Babicz, 2001). As Kathy Roberts says: ‘I tell my clients that even if they’re not interested in registering to 9001, they should look at 9004 for ways to improve their businesses.’

5. Implementing the standards

Any company with an ISO 9000 certificate already has three years to comply with the new version of the standard. For many companies the implementation of the previous version of ISO 9000 brought both significant opportunities and risks. The transition to ISO 9000: 2000 brings similar opportunities and risks (Cargill 2001). If implemented properly, the business-process approach of ISO 9000: 2000 will provide a framework for bottom-line improvements by streamlining the manufacturing and business processes, and certification to ISO 9000: 2000 will bring tangible marketing benefits. Achieving the maximum benefit at minimal cost will require a good understanding of process-management principles, both on the part of the

company implementing the changes and on the part of the auditor verifying them. To achieve this successfully within the transition period, companies should take on board these three key recommendations.

1. The implementation of the business-process approach should be given top priority in transition plans. Work in this direction should begin as soon as possible and should ideally include the training of key personnel, where required, on the introduction of this approach.
2. Transition should be used as an opportunity to develop a QMS on which a business-management system capable of being easily developed to cover environmental requirements can be built.
3. Third-party auditors should be competent to audit against ISO 9000: 2000. A minimum of 30-40 days per annum direct audit experience in industry, along with formal training to the new ISO 9000: 2000 requirements, is recommended.

The experience of several companies shows that there are two major hurdles to implementing transition to ISO 9001: 2000 (Walker 2001). Firstly, transition team members and the senior management that supports them must understand what the changes are. Individuals should study the standards, work with their registrars and seek third-party assistance where necessary in order to accomplish this. Secondly, the current situation and the goals need to be established, and a method for getting from one to the other as effectively and efficiently as possible created. There are models that a company may use for a transition plan, but these models constitute only a supplementary methodology and should be used in conjunction with appropriate resources such as the ISO standards, and quality and business management principles.

Case study: the ceramic industry

ISO certification can be a tricky process at best and a bureaucratic nightmare at worst. Many ceramic manufacturers are reluctant to become involved, simply because they do not understand the implementation process and cannot see how the standards will benefit their company (Cargill 2001). The change that is likely to be most significant in terms of both opportunity and resources for the ceramic industry is the business-process approach, a principle that is little understood (Cargill 2001). With a review of how ISO 9000 has been implemented within the industry in the past and an explanation of the business-process approach, ceramic manufacturers could ensure a smooth and effective implementation over the three-year transition period.

In general terms, ISO 9000 systems have been implemented in a manner that sits between the following two scenarios (Cargill 2001). Scenario type A, the more desirable approach, is the development a quality system appropriate to the complexity of the organization and competence of its personnel, the main emphasis being continual improvement. Once established, adjustments are made to the system and activities formalized in documented procedures. A quality manual is written and ISO 9000 certification applied for. The resulting system is appropriate to the company's needs. Scenario type B is far more common. Here the aim is to achieve ISO 9000 certification as quickly as possible. Often this involves bringing in consultants, usually from outside the industry and typically with an engineering background, who supply a ready-made system. Everything is focused on achieving certification to ISO 9000. The main problem with this scenario is that the focus tends to be on paperwork and bureaucracy, not improvement. Companies end up implementing a system that is not tailored to their needs and written around the requirements of ISO 9000 rather than the way in which the company works.

The initial assessment and ongoing surveillance required by the certification process can either improve or compound the problem highlighted in scenario type B. If the certification process is to add value to a company, a key issue is the auditors' competence, particularly in terms of industry experience. While accreditation organizations such as the Registrar Accreditation Board (RAB) are tightening up on the experience criterion, the net result can again be a focus on bureaucracy. As recommended above, 30-40 days direct auditing experience per annum should be considered the minimum for an auditor to conduct a value-adding audit. If you place an auditor unfamiliar with the industry sector into a type B scenario, the audit is likely to focus purely on established procedures. Questions as to the value or relevance of the procedures are unlikely to be asked; a disproportionate amount of time is also likely to be spent on document control and

calibration. A system that may not have been totally appropriate to the company can, in fact, be made worse. The auditor unfamiliar with the industry simply pushes the company towards generating more procedures, or actually prevents it from developing its system into a more suitable form (Cargill 2001).

ISO 9000: 2000 demands much more involvement from senior management, which for some companies will require a major shift. As Reg Blake says: 'When the standard talks about training, it really has to be driven from the top and involve all levels of the organization.' Companies should become more customer-focused: those close to the revisions point out that the customer is a big driver in the standard. Most metal centres understand the importance of customer focus; those seeking ISO 9000 certification will be required to document the way they address customer issues.

6. Return on the investment

ISO certification is a cost that must have a return, an investment companies make in order to increase annual sales and therefore benefits. There will be a return on the investment: if approached in a step-by-step fashion, the transition to the new standard should not be costly. Jack West believes that the new standard may offer metal centres 'a way to reduce the cost of operating their system. They may be able to develop alternative ways to achieve cost control.' He also says that the new standard is better suited to the service industry and far easier to read and understand than the previous version; this should aid small companies and make certification more economical (Zuckerman 2000).

However, the question remains: in what areas of the company will performance improve as a direct result of ISO 9000: 2000? How can this improvement be measured? Some benefits cannot be quantified, for example, ISO 9000 is a must in the market. If a company's competitors invest in it, what would happen to that company if it did not? The cost of certification varies and depends on several factors, including the size of the company. Most companies have a quality system in place, but compliance to the standards means documenting the system, often internally, which expends resources. Outside resources used for implementation will add to the bottom line. Steve Wilson (director of the Powerway Institute (Indianapolis)) has also pointed out that once an ISO 9000 programme is up and running, the cost of system maintenance, while not significant, must be considered (Yamada 2001).

According to a Canadian local-government authority, which has implemented ISO 9000: 'Each dollar invested generates at least a four-fold return if the standard is implemented well' (Yamada 2001). In today's climate of tough budgets, it would even be useful for non-profit organizations to be able to demonstrate their efficiency in terms of cold hard cash to the governments or other stakeholders that fund their operations.

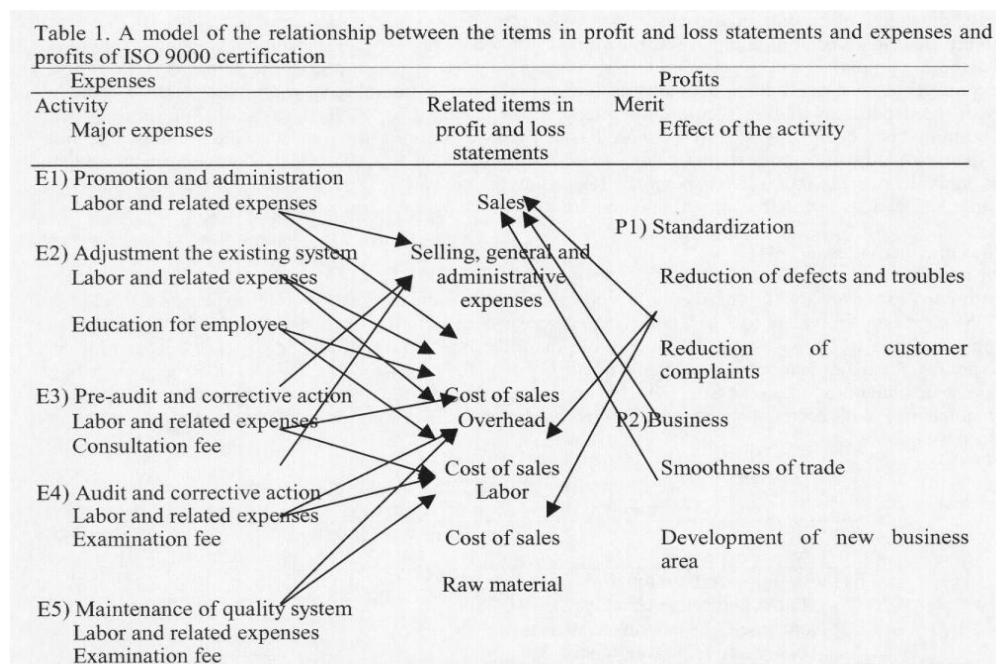
One of the most important factors in recent business models has been speed: speed of decision-making, preparation of production, no-stock, supply chain and so on. ISO 9000 certification may play an important role in speeding up processes, since purchasers would not have to evaluate the suppliers if they are certified to ISO 9000, which implies that the quality of the suppliers' products of the suppliers is assured. The effects of ISO 9000 need to be considered under several headings. For example, some papers, based on questionnaires, have quantified the effects of ISO 9000 in terms of smoothness of trade, complaints about products, process defects, etc., others in terms of product quality, customer satisfaction, etc. There is no general review of the studies of the consequences of ISO 9000 certification that also evaluates the consequences themselves by a questionnaire survey.

One paper researches the financial aspects of ISO 9000 certification in Japanese companies based on an estimation of expenses and profits resulting from certification (Yamada 2001). Yamada first outlines a model that expresses the relationship between the activities associated with certification, certification expenses, profits resulting from certification and financial indicators (falling into categories such as sales, general and administration) in profit and loss statements and elsewhere. There then follows a case study of a particular company and an attempt, based on the model, to quantify the company's ISO 9000 certification expenses.

The model describes the sequence of activities for certification as follows:

- (a) The establishment an organization for the promotion and administration of certification activities;
- (b) The adjustment of the existing quality system under the leadership of the organization established at step (1);
- (c) Pre-audit and corrective action undertaken consequently;
- (d) Audit and corrective action undertaken consequently;
- (e) Maintenance of the certified quality system after the registration of the certified quality system.

The model is then adjusted to account for the connections between the five steps and items in profit and loss statements. For example, labour and other expenses connected with step (1) may relate to 'selling, general and administration expenses' or 'cost of sales - overhead', both of them common non-producing activities, in a profit and loss statement. Labour and other expenses connected with step (2) may relate to 'selling, general and administration expenses', 'cost of sales - overhead' and 'cost of sales - labor'. ('Cost of sales - labor' is connected to step (2), since the activities step (2) involves are directly related to the product/service, unlike the activities of step (1).) Similarly, the expenses connected with employee education may relate to 'cost of sales - overhead' and 'cost of sales - labor'. The relationship between the activities associated with ISO 9000 certification and items in profit and loss statements are likewise derived from examination of the activities that constitute steps (3), (4) and (5). The relationships are summarized in table 1.



Motivation for ISO 9000 certification may vary from company to company. The 'reduction of defects and troubles' and the 'reduction of customer complaints' are typical of the benefits of certification brought about through improvement of the quality system. Establishing process standards can therefore be regarded

as essential. Certification also brings business benefits, such as an ability to meet customer requirements, smoothness of trade and the development of new business areas. Once a reduction of customer complaints has been attained, sales may be expected to increase, so the reduction may be connected to sales amount in profit and loss statements. Similarly, a reduction in defects and troubles may be connected to labour and raw material costs in profit and loss statements.

Case study: estimation of certification expense

An electrical equipment division in company A was certified to ISO 9001 a few years ago. Around 300 people worked in the division, and total annual sales were around 100 million USD. The information for this case study is taken from Yamada's paper (Yamada 2001).

(a) Step 1 – Promotion and administration. The senior management of the electrical equipment division declared a desire to be certified to ISO 9001 at the end of 1993 and an organization for promotion and administration of the certification was established in January 1994. The promotion and administration activities were mainly carried out by a committee, here denoted committee X. Committee X consisted of three full-time dedicated staff and fifteen staff who worked in other departments and were involved in the certification process. The three full-time staff constituted a secretariat, which was responsible for arrangements such as the employee education. Committee X met every two months in order to draw up a schedule for implementation of ISO 9000. Labor and other expenses related to the promotion and administration of ISO 9000 certification over a period of 18 months were estimated at 705,000 USD, (with 1USD = 105JPY), equivalent to 470,000 USD for a year;

(b) Step 2 – Adjustment of the existing quality system. Activities relating to the adjustment of the existing quality were mainly undertaken by two committees: committee X and committee Y, which consisted of thirteen member of staff selected from various departments, such as production and quality assurance. Committee X prepared the common standard for all departments while committee Y prepared the standards for individual departments. Committee Y committee met roughly once in a month. Costs worked out at 3,105,000 USD (2,070,000 USD per year). Education, labour and other expenses (such as lecture fees) were 20,000 USD for the eighteen-month period, i.e., 19,000 USD for a year;

Table 2. Estimated expenses of certification and maintenance
(An electric division in company A)

Activity	Estimates (1000US\$)	
Major expenses		/year
E1) Promotion and administration		
Labor and related expenses	705	470
E2) Adjustment the existing system		
Labor and related expenses	3105	2070
Education for employee	29	19
E3) Pre-assessment and corrective action		
Labor and related expenses	648	432
Consultation fee	10	6
E4) Assessment and corrective action		
Labor and related expenses	10	6
Examination fee	19	13
Total	4524	3016
E5) Maintenance of quality system		
Labor and related expenses	1286	1286
Examination fee	10	10
Total	1295	1295

(c) Steps 3, 4 and 5 – Other activities.

The estimated expenses for steps 3 and 4 are given in Table 2. The total expenses are 4,524,000 USD, the equivalent of 3,016,000 USD for a year. It will be seen that the labour and related expenses were a major part of the cost of certification. Maintenance of the certified quality system was estimated one year after certification at 1,286,000 USD for the year. According to the interview survey, the maintenance expenses will decrease as the number of the staff in promotion and administration decreases.

The estimated certification expenses amounted to approximately 2 per cent of the total sales. However, the company's profit ordinarily amounted to 2 per cent of the total sales. From this it may be seen that certification expenses can be substantial, so a more efficient approach to certification to ISO 9000 should be sought, as far as both the company and the certification system are concerned. In a case study of the steel

industry, Yamada shows that expenses associated with step (1) constitute approximately 0.1 per cent of the sales total, whereas the equivalent figure for company A is more than 0.4 per cent. The difference may result from the size of the company in the steel industry case study, which is considerably larger than company A.

7. Barriers

Is certification to ISO 9000 worth the hassle and money? After all, it can cause disruptions in what seemingly is an already healthy process. If things have worked one way for years, why bother with certification? Is it just another ploy to bleed companies of thousands and thousands of dollars?

Implementation requires cooperation. The implementation of a quality programme is no mean feat, and without management support it is unlikely such a programme would be successful. Steve Wilson (director of Powerway Institute, Indianapolis) says that efficiency can be achieved if all members of management are in agreement; disagreement will cost money (Yamada 2001). Not only is support from the upper echelons of management necessary, everyone involved within the company should be committed to certification. Old-school minds and attitudes change with difficulty. In the past, workers could simply look at a part for defects, but ISO 9000 does not allow for quality approval by eye. Changing the mindset and gaining the confidence of employees who question the validity of implementing a new programme that requires the filling out and tracking of vast amounts of paperwork is a challenge.

George Roberts (director of ISO systems for Maytag Corp., USA), tackled a similar situation when implementing ISO 9000 concepts in Maytag's refrigerator plant at Galesburg, IL. To combat the problem, he assembled a steering committee representing all groups within the facility: human resources, finance, quality assurance, manufacturing, engineering, material control and procurement (Babicz 2000). Each group was given the task of ensuring compliance to an ISO 9000 standard, which included writing the procedures and work instructions from beginning to end. Work done by one group had to meet approval by all other groups. The process demonstrated the importance of each group's involvement in quality and of a complete view of the cross-functional aspects of the company.

ISO 9000 requires the training of employees, a monetary roadblock for many companies. Training shows its worth when a new system is used correctly and consistently from the beginning. Documentation may take time and resources, but templates are available for companies to use, avoiding the need to start from scratch. Furthermore, certification should not be considered the end of the road, merely as a milestone. Once a system is in place, the system must be maintained and updated on a regular basis. A quality programme is only as good as the people and the system itself (Babicz 2000).

In addition to barriers within organizations, there are external considerations. According to some manufacturers, quick-and-dirty certifications are giving certification a bad name. John Troyer, a former chairman of the Indiana Manufacturing Association (IMA), an Indianapolis-based ISO 9000 users' group, says: 'There are enough quick-and-dirty certifications that tarnish the whole certification process ... About the time the year 2000 hits, the whole thing is going to explode.' (Babicz 2000) Troyer made this pronouncement in 1999, but the risk of quick-and-dirty certification is still perceived by some to be high.

Case study: firestone

QS 9000, the Big Three automakers' common quality standard, played a role in the Firestone tyre recall case. Robert Wyatt, Firestone's vice-president of quality, said during congressional hearings on the tyre recalls that QS 9000 had a 'causal effect' in the case. However, standards experts consider Wyatt's testimony regarding QS 9000 to be a red herring, intending to pass the liability from Firestone's management to quality registrars that offer QS 9000 certification. While not defending QS 9000 as a standard worth pursuing, standards experts like Henry Line do not believe that QS 9000 would have anything to do with the product outcome in this case or any other. Ironically, the Big Three developed QS 9000 because they did not consider the ISO 9000 standards rigorous enough to promote quality on the level the auto industry desired (Zuckerman 2000).

8. *Benefits*

Organizations are under intense pressure to evolve their thinking from one responsible for institutional modes of operation to a stakeholder-focused, businesslike mindset. In choosing ISO 9000 as the model on which to restructure operations, managements can have the confidence that comes from implementing a standard that forms the basis for more than 350,000 quality systems in 150 countries, in both private and public sector organizations.

One advantage of achieving certification is the opportunity to work with companies that require suppliers to meet ISO 9000 standards. As Steve Wilson says: 'The trophy you're after is customer loyalty.' Improved customer-supplier relations build customer loyalty. In turn, those customers promote the companies that meet or exceed their expectations. In addition, ISO 9000 helps a company gain knowledge of how current business is performing; the tangible results of certification help planning for the future; and knowing a company's capabilities can lead to expansion or improved efficiency.

At Maytag Corp., USA, the first steps towards ISO 9000 certification helped create a uniform system. An inconsistency was discovered: the process control varied between shifts. 'We thought we knew what we were doing, but we didn't really know,' said George Roberts. The refrigerator plant facility is now consistently audited to eliminate non-value-added activities. Other benefits of certification for Maytag included lower warranty cost, reduced scrap, leaner processes and a more informed workforce. Although George Roberts cannot reveal the actual cost savings made at Maytag by implementing the quality system, he did say that the savings have been substantial. 'The system pays for itself, time and time again. We realize it pays us back every day' (Babicz 2000).

ISO 9000: 2000 is more effective as a standard as a result of having incorporated considerations of continual improvement and customer satisfaction. If an enterprise enjoyed a marketing advantage because it was registered to ISO 9000: 1994, then ISO 9000: 2000 should give it an even greater edge. Unlike ISO 9000: 1994, which was designed with manufacturing plants in mind, the purposely generic new standard is as readily applicable to a medical facility or school as it is to a factory.

B. ENVIRONMENTAL MANAGEMENT STANDARD ISO 14000

1. *Introduction*

Environmental issues have been a secondary priority for most companies. The seeming incompatibility of consumerism and the environment has worried those who have been involved in moving business organizations towards a cleaner mode of operations. Indeed, in October 2000, the UK Prime Minister, Tony Blair, noted that 'Consumption and the environment have not necessarily been natural partners.' However, significant change is afoot. Joe Goasdoue (chief executive of the British Quality Foundation) points out that 83 per cent of managers are most positive about the impact ISO 14001 is having on their businesses. It is also interesting to note that this information formed part of survey in the journal *Quality* (Moorcroft 2001).

The last decade has seen a shift in management paradigms from the 'or-paradigm' to the 'and-paradigm' (Montabon, Melnyk, Sroufe and Calantone 2000). In the past, managers saw things only in terms of trade-offs (the 'or-paradigm'), that is, you could have low cost or short lead times or high quality or high flexibility. Superior performance was attainable in any one of these areas, but not in two or more areas. However, managers today are expected simultaneously to reduce lead times (manufacturing, purchasing and design), improve quality, reduce costs and enhance flexibility (the 'and-paradigm'). Managers are also expected to become more environmentally conscious and responsible as a business requirement. For manufacturing managers, this has meant reexamining products and processes, with an eye toward the reduction or elimination of waste streams. For purchasers, the corresponding challenge has been to identify suppliers who can provide environmentally responsible goods and services without sacrificing cost, quality, flexibility or lead times. Generally, it has also meant identifying and evaluating any initiative consistent with these new expanded objectives. One such initiative is ISO 14000 (Montabon, Melnyk, Sroufe and Calantone 2000).

Concern about the environment is growing worldwide (Rezaee 2000). Environmental costs and obligations have grown substantially and will continue to grow as society becomes more conscious of its environment. Laws and regulations relating to the environment are increasing in number, and corporations face increased pressure to be environmentally responsible. Many countries have enacted legislation intended to make organizations more accountable for their environmental obligations, and companies have responded by taking a proactive stance on voluntary initiatives.

Exhibit 1: ISO Categories and Related Standards

Category	Standards
1. Environmental management systems (EMS)	ISO 14001, which provides core requirements for establishing and maintaining an EMS that an external third party can certify or register
	ISO 14002, which provides guidelines on ISO 14001 for small- and medium-sized enterprises
	ISO 14004, which explains EMS and helps companies tailor it to their operations
2. Environmental auditing	ISO 14010 — General methods on environmental auditing
	ISO 14011 — Audit procedures—Auditing of EMS
	ISO 14012 — Qualification criteria for environmental auditors
	ISO 14013 — Management of environmental audit programs
	ISO 14014 — Initial reviews
3. Environmental labeling	ISO 14015 — Environmental site assessments
	ISO 14020 — Environmental labels and declarations
	ISO 14021 — Environmental labels and declarations; self-declared environmental claims—terms and definitions
	ISO 14024 — Environmental labels and declarations—Environmental labeling Type I.
	ISO 14025 — Environmental labels and declarations—Environmental labeling Type III
4. Performance evaluation	ISO 14031 — General guidelines on environmental performance evaluation
	ISO 14032 — Case studies illustrating the use of ISO 14031
5. Life-cycle assessment	ISO 14040 — Life-cycle assessment—Principles and framework
	ISO 14041 — Environmental management in life-cycle assessment—Goal and scope definition and inventory analysis
	ISO 14042 — Life-cycle assessment—impact assessment
	ISO 14043 — Life-cycle assessment—interpretation
	ISO 14047 — Examples for the application of ISO 14042
	ISO 14048 — Life-cycle indicator format
	ISO 14049 — Examples for the application of ISO 14041
6. Environmental aspects in product standards	ISO 14064 — Guide for the inclusion of environmental aspects in product standards

Developed in 1996, ISO 14000 was the first globally recognized guidelines for voluntary environmental management. It contains a set of generic tools for developing, implementing, maintaining and evaluating environmental policies and objectives, and the series contains standards for environmental management systems (EMSs), environmental auditing, life-cycle assessment, environmental labelling and environmental performance evaluation (Proto and Supino 2000). Figure II outlines the six categories of ISO 14000 and their related standards. Like ISO 9000, ISO 14000 may one day become a prerequisite for competing in the global market while also helping to safeguard the earth's resources (Rezaee 2000). ISO 14000's standards help safeguard the environment by monitoring a company's compliance with both internal and external laws, regulations and policies. These include laws governing: a company's ongoing environmental conduct (for example, in the USA, the Clean Air Act Amendment of 1990); cleanup of contamination caused by a company's business activities (for example, in the USA, under the Superfund Act of 1980); and personal injury or property damage caused by exposure to chemicals and other pollutants.

An EMS is a system for improving an organization's environmental performance. Its main objectives are to protect the environment and prevent pollution. An EMS should define environmental goals and missions; develop adequate and effective environmental policies and procedures; document these policies and procedures properly and communicate them to affected personnel; ensure compliance with the body's established environmental policies and procedures. Adopting an EMS should provide management with information on how an organization performs with respect both to requirements imposed from outside and objectives and policies established internally. figure III presents the principles on which an EMS should be based and describes outside auditors' involvement in helping clients achieve these goals (Rezaee 2000).

Exhibit 3: EMS Principles and Auditors' Involvement

Principle	Description	Outside Auditors' Involvement
Environmental policy	<ul style="list-style-type: none"> ■ To establish environmental policy to ensure the EMS's mission and goals are achieved. ■ Monitor this policy continually for the success of the EMS. 	<ul style="list-style-type: none"> ■ Review the adequacy of the established EMS in achieving an organization's environmental goals. ■ Evaluate whether EMS is meeting environmental performance objectives.
Planning	<ul style="list-style-type: none"> ■ To develop an implementation plan for the environmental policy. ■ To establish procedures for identifying effects of an entity's activities on the environment. ■ To formulate documented environmental objectives and goals. ■ To develop environmental performance measurements to assess the success of the EMS. 	<ul style="list-style-type: none"> ■ Assess proper documentation and communication of environmental policies and procedures to all affected personnel. ■ Examine the client's environmental activities to ensure that the EMS plan's provisions are being effectively followed.
Implementation and operation	<ul style="list-style-type: none"> ■ To develop the appropriate resources, both human and physical, to implement the environmental policy. ■ To integrate the EMS into the existing managerial structure. ■ To develop environmental awareness in the entity by providing employees with appropriate training to achieve the environmental objectives. ■ To establish an emerging response plan to deal with environmental accidents. 	<ul style="list-style-type: none"> ■ Perform a systematic evaluation of EMS to ensure it is functioning properly. ■ Assess whether EMS has been effectively implemented.
Checking and corrective action	<ul style="list-style-type: none"> ■ To measure the entity's ongoing environmental performance against the goals and objectives of the EMS. ■ To implement appropriate corrective and preventive action. ■ To monitor the EMS to determine the effectiveness of the action. ■ To conduct periodic auditing of the EMS by an objective, competent auditor. 	<ul style="list-style-type: none"> ■ Determine areas where EMS does not meet the requirements of relevant environmental laws and regulations, including ISO 14000 standards. ■ Recommend follow-up actions to clear up any deficiencies. ■ Suggest corrective actions to eliminate noncompliance with applicable environmental laws and regulations.
Management review	<ul style="list-style-type: none"> ■ To develop a managerial process to continuously review the EMS to ensure overall improvement of environmental performance. ■ To review environmental goals and objectives on a regular basis. ■ To make the necessary changes or adjustments to achieve the effectiveness of the EMS. 	<ul style="list-style-type: none"> ■ Periodic review of the EMS to ensure that the system responds as planned. ■ Ensure that the EMS is properly maintained and that continuous improvement is being sought.

The best known standard in the ISO 14000 series is ISO 14001, which specifies the requirements for an EMS. It is the only standard that provides the basis for certification of an organization's EMS, and the stakes are high for businesses of all sizes across all industries to attain registration and certification to ISO 14001.

(a) *Environmental auditing*

Environmental auditing is a term that encompasses a wide range of environment-related management activities, including compliance audits, liability audits, waste management audits, risk assessments, reviews and management systems audits. Companies use environmental auditing as a means of responding to the increasing number of laws and regulations relating to the environment, external pressures and the need to manage environmental risks and concerns properly. With ISO 14000, environmental auditing extends to continuous monitoring of an organization's environmental performance by: reviewing the adequacy of the established EMS in achieving an organization's environmental goals; assessing the documentation and communication of environmental policies and procedures to all affected personnel; investigating effective compliance with these policies and procedures in achieving environmental goals; conducting periodic reviews of the EMS to ensure it responds as planned; taking corrective action to eliminate non-compliance and non-conformance with ISO 14010, 14011, and 14012 standards (see figure II); and ensuring a commitment to continuous improvement.

ISO 14000 standards provide guidelines for the audit process, including sufficient resources and cooperation from the auditor; the proper conduct of audit procedures from preliminary document review to preparation of the final audit report; and the selection of internal and external auditors, ensuring adequate training and proficiency, experience and education

(b) *The role of certified public accountants (CPAs)*

The ‘Statement on Standards for Attestation Engagements no. 3 - Compliance Attestation’ governs the auditing of an entity’s compliance with ISO 14000. It provides guidance for engagements relating to management’s assertions regarding compliance with environmental laws and regulations, particularly ISO 14000 standards. It is the management’s responsibility to ensure that the entity’s environmental practices are consistent with the goals it has set itself and that they comply with the relevant laws, regulations and standards; it is the auditor’s responsibility to assess the entity’s compliance.

Public-practice CPAs may perform agreed procedures to help users evaluate entities’ environmental activities and performance. The role of CPAs in this emerging service area is twofold. The first is to aid employers and clients in pre-certification activities, including developing an EMS, conducting environmental audits and evaluating environmental performance. The second is to help clients become certified to ISO 14001 by evaluating products for compliance with ISO 14000 standards, including guidelines for life-cycle assessment, environmental labelling and the environmental aspects of product standards.

To establish an EMS, both internal and external auditors can avail themselves of ‘Internal Control-Integrated Framework’, a report issued in 1992 by the Committee of Sponsoring Organizations of the Treadway Commission. An adequate and effective EMS requires a company to establish its environmental management policies and procedures across the entire business, including accounting and auditing services. Figure IV shows the connections between the five control components specified in the COSO framework and an EMS (Rezaee 2000).

Exhibit 4: COSO Report Provisions in an EMS	
COSO Report Provisions	Environmental Management System
Control environment: Integrity, ethical values and competence of personnel as well as management’s philosophy and operating style.	<ul style="list-style-type: none"> ■ Establishing an active and effective board of directors oversight function over environmental activities. ■ Establishing an adequate and effective EMS that defines environmental goals and strategies. ■ Reviewing management’s planned decisions regarding the appropriateness and effectiveness of the established EMS.
Risk assessment: Identification, analysis and management of risk.	<ul style="list-style-type: none"> ■ Establishing mechanisms for the identification and assessment of environmental risks relevant to the entity’s unique environmental circumstances. ■ Identifying environmental risk, estimating its significance, assessing the probability of its occurrence and managing environmental risk.
Control activities: Policies and procedures to ensure effective implementation of EMS.	<ul style="list-style-type: none"> ■ Establishing control activities for identifying, measuring, assessing and managing environmental risk. ■ Implementing proper control activities to ensure and maintain the integrity of the established EMS. ■ Facilitating management control of environmental practices.
Information and communication.	<ul style="list-style-type: none"> ■ Creating the type and quality of information needed for effective EMS. ■ Ensuring that control activities and responsibilities relating to EMS are understood across the entity. ■ Creating adequate systems for gathering and processing environmental information, including sound accounting systems for measuring, recognizing, and disclosing environmental costs and obligations.
Monitoring.	<ul style="list-style-type: none"> ■ Monitoring control systems relating to environmental activities to ensure the integrity of EMS. ■ Assessing compliance with EMS goals and policies, including meeting regulatory requirements. ■ Designing environmental audit procedures to examine compliance with applicable environmental legislation, regulations and standards.

CPAs can help clients or employers establish an EMS in three ways.

(a) Identification of all environmental-related problems. Managers at all levels should pay sufficient attention to the environmental impact of their actions and must make compliance with ISO 14000 as well as other relevant laws and regulations a high business priority;

(b) A proactive approach to the management of environmental problems and risks in the EMS itself, both at management level and in the area of compliance. The EMS's policies, procedures and guidelines must be carefully designed, properly communicated to all affected personnel and complied with. The EMS should not only undertake curative action in relation to environmental problems and risks, but also preventive action, by making employers aware of the relevant laws, regulations and standards as well as of the environmental impact of various actions. The EMS's success ultimately depends on the management's commitment to making sure environmental concerns and controls are everyone's business, and this commitment should be demonstrated through policy statements and actions;

(c) Integration of the EMS into the internal control structure. The COSO report suggests that companies should integrate the EMS with other critical internal control functions. Under ISO 14000, environmental considerations should be part of virtually every major corporate decision.

(c) *Training resources*

To respond to the growing demand for environmental auditing, the Institute of Internal Auditors and the Environmental Auditing Roundtable established the Board of Environmental Auditor Certification (BEAC) in 1997. BEAC is an independent, non-profit organization that certifies environmental auditors based on ISO 14000 standards and other key criteria.

The International Auditor and Training Certification Association (IATCA) is another voluntary international organization established to sponsor and operate programmes for certification and the harmonization of training internationally. IATCA has approved auditor training courses and provided auditor certification in relation to ISO 9000. A working group has begun preparing similar approvals and certifications for environmental auditors. The RAB provides several choices of auditor certification programme and certification at several grades to match candidates' level of experience and need (Rezaee 2000). More information on IATCA EMS programs may be found on the website of the Registrar Accreditation Board (RAB), www.rabnet.com.

(d) *Case study: ISO 14000 certification for steel-makers*

Ford Motor Co. and General Motors require their suppliers to be certified to ISO 14000. Other steel users have followed suit, and more are expected to adopt similar requirements for their suppliers. Many in the steel industry are balking at what appears as another costly mandate with limited benefits. Some of the steel-makers' objections centre on the requirement for an EMS; and many in the industry neither have a compliant EMS nor relish the idea of developing and implementing one (Chalfant 2000).

The steel-makers' point of view is perhaps understandable. In the past, they have expended large sums of money to comply with regulatory requirements; the prospect of spending even more money to develop and implement an EMS is not attractive. However, a properly designed EMS can enable steel-makers to develop initiatives that ultimately save money and decrease the risk of future fines, liabilities and regulatory action (Chalfant 2000). To understand the full range of benefits afforded by an EMS, steel-makers should consider the benefits of their preventive maintenance programmes. Great strides have been made in developing effective examples of such programmes, which have improved reliability, product quality and the life of process equipment. They have also done much to satisfy client requirements and improve corporate profitability. To achieve similarly positive results in the environmental arena, Chalfant suggest replacing the term 'environmental management system' with 'environmental maintenance system' (Chalfant 2000). This change in terminology may help the steel industry form a different view of EMSs. An EMS will ultimately benefit the steel-maker by decreasing production stoppages associated with environmental equipment

failures, minimizing the risks of costly fines and penalties, and involving personnel in the decision-making process for implementing desired improvements.

Regulatory mandates always have been and perhaps always will be perceived negatively. However, in requiring EMS and certification to ISO 14000, Ford and General Motors are leading by example. They have themselves adopted the requirements and are also investigating ways of helping suppliers benefit from the lessons they have learned in implementation. Working together with these highly valued clients provides the steel industry a unique opportunity to become more efficient in environment-related matters.

2. Areas covered by the standard

As may be seen in figure II, the standards of the ISO 14000 series fall into six categories.

- (a) Environmental management systems;
- (b) Environmental auditing;
- (c) Environmental labelling;
- (d) Environmental performance evaluation;
- (e) Life-cycle assessment;
- (f) Environmental aspects of product standards.

An important principle of ISO 14001 is that it does not establish absolute environmental performance requirements (Proto and Supino 2000). The key elements of the ISO 14001 EMS are:

- (a) An environmental policy committed to compliance, continual improvement and the prevention of pollution (Proto and Supino 2000), and the requirements to pursue this policy via objectives, targets and programmes;
- (b) Analysis of aspects of an organization that impact on environmental issues, including its processes, products and services, as well as goods and services used by the organization;
- (c) Implementation and organization of processes to control and improve operational activities that are critical from an environmental perspective;
- (d) Monitoring, measurement and corrective actions to ensure that objectives and targets are achieved;
- (e) Conduct of audits to determine whether the EMS is indeed functioning well and management reviews to address the possible need for a change of policy;
- (f) Objectives to ensure the continuing suitability, adequacy and effectiveness of the EMS.

ISO 14000 contains five distinct elements, all of which can be audited for accreditation purposes. As with all standards, it is worth noting that there are no absolutes: it is for organizations to set the outcomes. This perceived weakness of standards is in fact a strength. The cliché may be true that you can make rubbish and still be accredited, provided you make it consistently. However, the market will decide the level of success a company can achieve. Most people do not buy rubbish!

The role of the Administrative Manager is to shape a process that reflects the philosophy and concerns of the standard. Administrative Managers have a responsibility to enhance efficiency, and so for this reason, if for no other, it is axiomatic that managers are obliged to explore the change process where innovation produces bottom-line benefits. There is much to gain and little to lose in terms of quality by considering the environmental perspective. The concept of sustainability may have its origins in consideration of all matters green, but it may also be applied in the world of management: environmental policy should itself be sustainable.

3. Barriers

Fears that the requirement for an EMS will result in a duplication of paperwork and cumbersome changes in data and reporting requirements appear to be largely unfounded (Chalfant 2000). In fact, companies should be able to modify existing reporting documents and possibly even electronic data into acceptable formats. The ISO 14000 EMS guidelines do not stipulate how data should be collected and reported, but focus on verifying that procedures are in place that ensure that data is collected, reported and appropriately reviewed.

Regulatory flexibility and the management support of domestic regulatory agencies are important for encouraging organizations to adopt ISO 14000 standards. Domestic and international economic realities ultimately influence an organization's decision to adopt the ISO 14000 standards. Regulation is sometimes too inflexible. Existing environmental statutes do not allow sufficient room for the regulatory benefits sought by most organizations contemplating ISO 14000 certification (Shin and Chen 2000). Regulatory incentive is lacking, and this is due partly to the rigidity of existing regulations and partly to the inflexible manner in which new programmes that incorporate EMS principles have been implemented. However, it is widely accepted that regulatory incentives are vital to the development of a worldwide drive for certification (Shin and Chen 2000).

Existing environmental statutes are more concerned with health and technology and are less sensitive to the need to control compliance costs. One enforcer of these rigid environmental statutes, the North American Association for Environmental Issues (EPA) is, to a large extent, reluctant to provide significant regulatory benefits such as fewer inspections, streamlined permission granting and reduced monitoring and reporting requirements (Shin and Chen 2000). ISO 14000 is a systems-based rather than a performance-based scheme, and it can be argued that certification to ISO 14001 alone could not guarantee that environmental performance levels set by law would be met (Shin and Chen 2000).

Adopting the ISO 14000 standards on financial grounds is only justified when the benefits outweigh costs. Though some companies benefit greatly from 'green' marketing, some entrepreneurs say that the conversion of ISO 14001 certification into marketing opportunities seems to be doomed to failure. A variety of factors affect a company's potential for financial returns on certification. Some take the view that being a set of system standards, ISO 14000 does not permit a strong marketable link to be made between having an EMS and the documentation of environmental performance. Green consumers are more likely to spend more on an environmental declaration that is credible and attached to specific products. For example, a desk with the label claiming that it is made of hardwood harvested in a sustainable manner could attract consumers who are especially concerned about deforestation. There have been some efforts in the USA to give more power to ISO 14001 certification institutions.

In every problem lies an opportunity to excel. Whether the EMS component of ISO 14000 certification is regarded as an opportunity or a problem depends largely on perception. However, those in the industry who view the requirement as an chance to improve environmental management, reduce potential liabilities and improve performance will have a significant opportunity to excel (Chalfant 2000).

4. Benefits

Why has ISO 14000 suddenly become of interest to managers? There are several reasons for this, all of them based on sound, pragmatic business principles that will enhance bottom-line results, but none of them are linked to any altruistic motivation. First, businesses are aware that there is a general move in the market towards 'ethical trading'. One in six people now actively pursues an environmental agenda when purchasing shopping and goods (Moorcroft 2001), and ISO 14001 gives external recognition to a company's green approach. Secondly, there is a powerful financial factor. For example, the UK Government has made over 150 million pounds sterling available to enable businesses to use cleaner, more efficient technologies, coupled with a further 50 million from EC funds. Similar subsidies are being made worldwide.

However, companies are generally wary of government grants and their associated bureaucracy, often considering them not worth the effort of application. Operational managers in particular, resist top-down

pressure to change process systems in order to comply with imposed funding restrictions. The impact on the bottom-line achieved by practicing environmental management principles is an important EMS benefit that is often overlooked. Tremendous savings can be realized from cost-saving opportunities associated with reducing waste, especially the often-overlooked material wastes of an operation, which in the past have often been considered 'the cost of doing business'. Improved energy efficiency, reduction of the use of water, scrap, solid and hazardous waste, streamlined permissions and reporting processes, and even the avoidance of compliance fines could easily add up to significant annual savings (Lutz 2000). The enthusiasm for ISO 14000 amongst operational management revealed by the British Quality Foundation Survey in the UK has a much more pragmatic basis: the bottom-line benefits are quickly and easily measured. As soon as the first energy bill arrives after a new environmental system has been introduced, the benefits can be seen. This is followed by material-cost gains at the half-year audit, which constitute the first stage of exponential, long-term increases in profit margins. Tony Blair has said: 'We can be rich by being greener,' and it seems there may be some substance in this. These benefits are, of course, most evident in production contexts, but there is increasing evidence of gains in the service sector.

ISO 14000 requires that all employees be made aware of the environmental responsibilities inherent in their job (Chalfant 2000). Associated training is aimed at teaching employees to exercise care in performing duties that carry environmental consequences. Similar awareness and training in preventive-maintenance programs have proven successful in harnessing the technical know-how of production-floor personnel in improving maintenance activities. EMS training should produce equally beneficial results for the operation and the community. One final practical consideration: marketing is based on organizations' gaining a competitive edge. As the means and know-how of attaining quality become more readily available to suppliers, there is a need to establish corporate features that distinguish an organization without too much additional effort and cost. The 'correspondence' – as the British Standards Institution (BSI) puts it – between the environmental standards of ISO 14000 and the quality standards of ISO 9000 provides clear evidence that this can be done (Moorcroft 2001).

A firm can implement an EMS that is in line with one of the EMS standards (BS 7750, EMAS, or ISO) without external certification. Situations in which external certification could become important include the following (Moorcroft 2001). A customer requires EMS certification as a condition of signing a contract. An organization supplies to a customer who strongly suggests that the organization become registered. A government provides benefits to registered organizations. An organization has a site in the European Union, where market pressure or the regulatory environment forces you to obtain registration or certification. A single international environmental standard can reduce the number of environmental audits conducted by customers, regulators or registrars. An organization exports to markets where EMS certification is a de facto requirement for entering the market. An organization expects to gain a competitive advantage through EMS certification. An organization's stakeholders (local community, shareholders, unions, etc.) expect environmental excellence, demonstrable by an EMS certification. If one of these situations applies, a firm should decide whether the whole organization should be certified, or only parts of it.

The champions of ISO 14000 suggest that it will unify countries in their approach to environmental management and will eventually be looked upon more favorably than traditional measures (Montabon, Melnyk, Sroufe and Calantone 2000). It has been argued that small manufacturing firms, which typically need the most direction in these issues, constitute the largest potential market for ISO 14000, and that the real test of the standards can be measured by adoption rates among these firms. However, it will be interesting to see how larger industrial customers react to the standards and their effect on their supply chain. Since general acceptance of the standards will come when all customers require conformance or certification, it will in fact be the predisposition of large corporations to ISO 14000 that will influence for the most part the adoption rates and ultimately the success of these standards (Montabon, Melnyk, Sroufe and Calantone 2000).

5. Case study: the Printed Circuit Board Industry in Hong Kong

The manufacture of printed circuit boards (PCBs) is always an environmentally invasive industry. Significant resources have been invested in the pre-treatment and disposal of the hazardous materials and wastes generated by the industry, while less effort has been put into the development of EMSs (Chin and Pun

1999). The launch of the ISO 14000 series has encouraged Hong Kong PCB manufacturers to be more environmentally proactive, particularly in their management systems, although there are several barriers hindering adoption of the standard (Chin and Pun 1999).

The benefits of ISO 14000 implementation fall into three categories—lowering legal liability, improved profitability and improved public image and staff morale. ISO 14000 compliance can be considered as a safety net against liability due to increasing environmental legislation. Improved profitability can be achieved through enhanced productivity, such as improved use of energy. Improving public image and staff morale can also enhance competitiveness. Over time, the boundaries between the three categories of benefit will become blurred. Despite the typical costs of ISO 14000 implementation (initial set-up as well as long-term maintenance and improvement), the attitude towards environmental issues is gradually shifting from one of minimum effort to meet enforced statutory limits to a recognition that paying attention to the environment can result in significant commercial and social gain. Of course, the current situation varies from country to country and culture to culture (Chin and Pun 1999).

6. Implementation

How to start? The easy option is to employ a consultant: external advice is objective and case-specific and enables managers to use experience and expertise acquired elsewhere. In the UK, assistance with funding is available from Local Learning and Skills Councils (the new name from March 2001 for the Training and Enterprise Councils (TECs)). Other options include sub-contracting to external specialists for the specific purpose of achieving accreditation, or employing extra staff to do the same thing. Whichever option is chosen, some training and learning is bound to be involved. In the UK, the IAM Syllabus recognizes the importance of environmental considerations; these may be supplemented with a practical course that offers accreditation. One UK partnership that matches this specification is the Chartered Institution of Water and Environmental Management (CIWEM) in conjunction with the Groundwork Trust, which offers managers a course entitled 'Practical Environmental Management'. This acts as an introduction to implementation of EMSs, and because the Institution is a chartered organization, the qualification holds some credibility. The UK Field Studies Council offers a similar course for the building and rail industry sectors

Businesses wishing to obtain certification to ISO 14001 should go through an independent evaluation and approval process, which consists of: establishing and implementing an appropriate EMS; filing an application for ISO 14001 certification; showing documentation regarding environmental policies, procedures, employee training and auditing; assessment by registrars, who certify compliance with ISO 14000 standards; and being approved and registered/certified to ISO 14001 standards.

The ISO itself does not issue certificates of conformity with ISO 14000. Bodies worldwide conduct the certification independently. However, organizations can choose not to certify or to self-declare their conformance with the ISO 14001 requirements. On approval, a company will receive certification to ISO 14001 and be listed in a register or directory. The database of registrars is available at www.iso14000.net.

There are three management elements in ISO 14000 implementation, namely: commitment and support from senior management; appropriate environmental policy; and regular management reviews. Like ISO 9000, ISO 14000 requires participation from all levels and functions of an organization, and many studies have pointed out that strong commitment and support from senior management are the key factors in continual improvement of environmental management, pollution prevention, regulatory compliance and adequate resource allocation. In addition, middle managers must be motivated to participate in developing environmental policy and appropriate plans for environmental system implementation. In order to maintain continual improvement in environmental performance, an organization's management should review and evaluate the EMS at regular intervals for its suitability and effectiveness (Chin and Pun 1999).

(a) Organizational change

Implementation of an ISO 14000 EMS usually requires important organizational changes in structure and responsibilities; training and awareness; communication; documentation and control; and readiness for

an emergency (Chin and Pun 1999). The changes must be clearly understood and supported by all employees, and the organization must also identify and implement education and training for all personnel whose work may create a significant impact upon the environment. The training should include environmental policy and the requirements of an EMS, relevant objectives and targets, job-specific environmental impact, the benefits of improved performance, and the consequences of non-compliance. For an EMS to be effective, an organization should establish and maintain procedures for both internal and external communication; documents should be easy-to-read, up-to-date, readily identifiable and maintained in an orderly manner; and procedures should be established and maintained for identifying potential emergency situations and appropriate responses.

(b) *External and social aspects*

Effective implementation of ISO 14000 is inevitably influenced to a great extent by external and social pressures, including environmental legislation, market pressure, and employee relations (Chin and Pun 1999). Multinational and commercial companies, particularly the high-profile ones, are expected to be pioneers in adopting a comprehensive EMS to enhance their public image, and ISO 14000 certification is one of the most effective means of achieving this. Moreover, an organization committed to the environment is more likely to bolster team spirit, engender loyalty and increase an organization's chances of attracting high-quality staff. Implementation of an ISO-14000-based EMS will be a good demonstration of such commitment.

(c) *Technical aspects*

There are also technical aspects to an effective implementation of ISO 14000, including assistance from environmental specialist, the availability of monitoring and measuring equipment, and production process enhancement (Chin and Pun 1999). Specialist environmental assistance is required because firms in the manufacturing industry generally lack knowledge of pollution-control technologies, risk assessment and control, and environmental management. Organizations also require reliable monitoring and measuring equipment to monitor and measure all activities that can have significant impact on the environment. Existing production facilities and practices in most of the industrial companies, particularly the small- and medium-size enterprises, cannot satisfy the ISO 14000 requirements for achieving regulatory compliance and optimum environmental performance, so production processes will have to be enhanced in an environmentally friendly way.

C. OPPORTUNITIES AND LIMITATIONS IN THE INTEGRATION OF ISO 9000 AND 14000

The case of Italaquae Group in Italy is outlined here, one of the few instances where quality and environment systems have been integrated. The description outlines the opportunities and drawbacks of the integrated approach. Global competitiveness has forced companies to invest more and more resources in enhancing their management efficiency and brought about profound changes that affect all aspects of business, from customer care and supplier management to strategy identification and implementation, from an unavoidable restyling and re-engineering of processes to an increase in the importance of the human resources role. Companies should pay attention to any method or approach that enables the business system to improve as a whole; quality represents one such approach.

1. *Integration opportunities and drawbacks*

The desire integrate of a company's QMS and EMS stems from seeing compliance with ISO 9000 and ISO 14000 as a managerial opportunity, rather than as an additional burdening on routine activities. Certification for a QMS and EMS are often perceived as bringing too much bureaucracy into all departments of a company, thus preventing businesses from seeing their true significance. Better exploitation of aspects common to the two ISO standards and their synergies can maximize the value derived from these systems; even drawbacks can become opportunities. Integration makes it possible to avoid using excessive means and human resources to comply with the two standards, and so certification boards and companies are interested in finding ways of implementing an integrated quality-environment system, because it offers companies greater opportunities for profit. An integrated system allows: cost reduction (because it improves data and

personnel management); homogeneity in management methodologies; and a decrease in the bulk of company paperwork and the creation of common forms that can be used more easily by several operators. Taken together, these lead to a reduction in personnel training time, a simplification and rationalization of the recording of data concerning the integrated quality-environment system and, to a lesser extent, concerning manufacturing activities customarily carried out by workers.

To test the feasibility of such an integrated system, formal research is needed whether the standards, as conceived by the technical committees, allow for such integration. In addition, one needs to test, on an operational level, whether integration can be effected in a company and what benefits integration can really bring. It has been seen that the QMS and EMS have elements in common: both employ the PDCA method, and both standards provide for the creation of a business policy (in parts 4.1.1 and 4.2 respectively) based on a common approach at all management levels to quality and environmental systems development.

Both standards require the appointment of a Director (ISO 9001 section 4.1.2.3, ISO 14001 section 4.4.1), who will see to it that the system is 'set up, carried out and maintained in compliance with the standards' and will be responsible for 'informing top managers on the system trend, so as to let them test it again and improve it,' (Renzi and Cappelli 2000). Although the text of the two standards is substantially the same, two different directors would be required because specific know-how on this level is of fundamental importance. As far as planning is concerned, both standards provide for a definition of action that must be supported by documentary evidence explaining the aims and targets the company intends to achieve, as well as a definition of the necessary means, either through plans (ISO 9001) or programmes (ISO 14001).

Another important aspect of both standards is internal audit (ISO 9001 section 4.17, ISO 14000 section 4.5.4), for which provision is made in order to test whether the company activities, QMS and EMS comply with what has been planned and inform management of the results. Integration in this area is certainly feasible, on both methodological and procedural levels, although certain differences on organizational and operational levels must be maintained, as audits for a QMS and an EMS require specific skills. The same may be said of third-party audits.

On a formal level, technical committees have conceived the standards in such a way as to make it easy for companies to implement them jointly. ISO 14000 was conceived in this way from the outset and ISO 9000 modified in 2000 taking this into account. But just how effectively can these systems be integrated? Some think that 'integration between systems can be carried out with a different percentage in deepening, depending on the business function involved'. Others feel that integration consists rather of the following (Renzi and Cappelli 2000): maximum integration at senior management level, as there is the same strategy; low integration at middle management level, because specific technical skills are required; and maximum integration among technical and other employees, since though technical skills are necessary to carry out particular activities, employees do not need to know anything about either the QMS or EMS.

Technical workers are of fundamental importance in the actual implementation of activities as provided for by the two systems and make it possible to monitor and test activities through a permanent data recording. Such information could be significant with regards to both the QMS and EMS: the quality manager and the director of the environment system can analyze the information and test it against scheduled targets. From an operational point of view, partial integration of the quality and the environment systems is feasible; for this reason, attempts at integration should be carried out with particular care. The experience of the Italaquae Group experience is of great interest in this respect.

2. Case study: the Italaquae Group

The Italaquae Group is a branch of the Danone Group, a world leader in the food industry. Italaquae is strongly oriented towards total quality management (TQM) policy, and has devoted itself to reorganization, livening up the approach to economic considerations, care of the environment, youth training, and long-term solutions. It occupies third place in the mineral water sector in Italy, with a market share of 11.2 per cent. The Group has been certified to ISO 9002 since 1995 and ISO 14001 since 1998. From a strategic point of view, the decision by Italaquae to undertake improvements in management and organization was due both to market forces and the global strategy of the Danone Group. Italaquae's corporate mission statement

underlines the fact that 'Italaquae choses to follow a policy of Quality Assurance, in order to achieve excellence in its field' and defines quality as 'all the characteristics and features enabling a product to satisfy customer need'. All Head Offices are held responsible for the implementation of the policy through information, motivation and staff organization. Considering the Group's specific field interests, a fair exploitation of springs and the protection of the natural environment around manufacturing areas are of fundamental importance.

Once it was decided that Italaquae should be certified to ISO 14001, the management preferred to exploit the synergies of the QMS and EMS and planned their integration, at the same time maintaining the aspects peculiar to each system separately. Senior managers made a great effort to work out a common strategy for the two systems, so that the environmental system is intrinsic to the company's quality assurance undertakings. At senior management level, there is already a total integration between the two systems.

The quality manager and the environment manager, though both reporting to the board of directors, have different tasks, responsibilities and staff. As the group owns three factories, the branch manager is supported by a departmental manager for quality and the factory safety and environment manager, and must answer to the board of directors for the implementation of the QMS and EMS. Once again, we can see that there is much integration at senior levels of different departments, but less at intermediate levels, where specific skills are required. From the general layout of the quality handbook, one can see that internal auditing and supervision for the two systems are integrated in methodology, but differ in practice.

Some think that full integration of quality and environment systems is possible. We hope that a new type of auditor, who covers both quality and environment will soon come into being, but that it would be better not to integrate quality and environment systems fully, on account of the specialist aspects of each system.

II. CASE STUDIES

A. LEBANON: MALIA HOLDING

1. *Introduction*

This case study is based on field work and describes a real-life situation involving a decision, a challenge, an opportunity and a problem faced by an individual at an organization. The individual in question is Rabih el Darwiche, the organization Malia Holding, and the decision certification to ISO 9000: 2000. A case researcher from United Nations visited Malia Holding and collected the data that comprise this case study in line with a research and reporting process centred specifically on the twin issues of organizational design and change management in relation to ISO certification. Malia Holding has signed an official release document giving permission for the data to be used in publication.

The purpose of including this information here is didactic: to help managers in effective organizations going through the certification process become effective according to ISO management standards. 'Effective organizations' are those that are able make their environments, their organizational structures and systems, their tasks, and their physical and human resources work in harmony. Case studies such as this one allow readers to accumulate experience while simultaneously appreciating the theoretical background.

2. *Background*

In 1938, Dr Jean Michel Sarraf founded the Sarraf Pharmacy in North Lebanon, an operation entailing the local preparation of medicines and filing of prescriptions. In 1951, a year after Dr Sarraf had obtained sole representation for Wella AG Germany for the Lebanon, Le Comptoir National de la Droguerie Sarraf was established in Beirut and began distributing pharmaceutical and cosmetic products throughout the country. Since then, this small family business has grown into Malia Holding, a Lebanese company with diverse interests that wholly owns several companies dealing mainly in the production, promotion and sales of cosmetics, fragrances, pharmaceuticals, insecticides, detergents and consumer products. Through its various companies, **Malia Holding** is also involved in real estate development and the IT sector. It secures financial stability and growth for the group by providing guidance and directives for long-term strategic planning, and by deciding policy, approving objectives and coordinating resource allocations. It is run by a board of directors who are specialists in the various activities covered by Malia Holding. The subsidiary companies are as follows.

Cosmaline is a technologically advanced manufacturing, filling and packaging plant producing hair and body cosmetics, insecticides, liquid detergents and aerosol products. It manufactures products under license, as well as brands that have been developed in house and private label products for third parties. Cosmaline is certified to ISO 9001 for its QMS and to ISO 14001 for its EMS.

Pharmaline is a technologically advanced manufacturing plant producing pharmaceuticals and parapharmaceuticals. It produces products under license, brands that have been developed in house and orders for third parties. The plant is certified to ISO 9001 for its QMS and ISO 14001 for its EMS.

Ch. Sarraf & Co. promotes, markets and sells cosmetics, fragrances, insecticides and consumer products. An in-house advertising agency provides the necessary support for market research, creative work and advertising management. Dedicated sales forces cover the Lebanese territory. The company is the sole Lebanese agent for Wella, Shiseido, Diego Dalla Palma, Payot and Burberry, ST Dupont, Francesco Smalto and Christian Lacroix fragrances. The company is certified to ISO 9001 for its QMS.

Pharmatrade specializes in marketing, promoting and selling pharmaceuticals and parapharmaceuticals. Its dedicated medical representatives and sales forces cover the Lebanese territory. The company is certified to ISO 9001 for its QMS.

Malia Overseas handles triangular business and assists companies in finding new markets and business opportunities for their products. The company is also a hardware and software solution provider.

Malia Trust is Malia Holding's central management body and provides services to the group in the areas of finance, accounting, human resources and administration. This ensures that each of Malia Holding's subsidiary companies has a light organization, thereby reducing operating costs. Malia Trust is certified to ISO 9001 for its QMS.

Malia Real Estate Development actively participates in local real estate development (Solidere), tourism (Dair el Natour), media (LBC) and construction projects (Sogedim). It is the representative for a number of foreign manufacturers of construction materials and heavy-duty equipment.

Malia International handles off-shore activities.

Malia Holding's diverse investment portfolio includes Bahriyah (a chartered company that provides maritime transport and entertainment services), bank stocks (namely Byblos Bank and Fransabank, both leading financial services providers in Lebanon), Lebrak and Propharma. The company's success stems from its commitment to teamwork, delegation of responsibility, operational autonomy, its healthy work environment and concern for a job well done.

3. The case

Rabih el Darwiche, an industrial engineer, was hired in 1998 as the Quality and Environmental Manager for Malia Holding, with the aim of establishing both a QMS and an EMS, an idea first floated in 1994 by Mr Sarraf, CEO of Malia Holding and President of the Association of Lebanese Industrialists. The first ISO certification was obtained in 1999. Instead of being process oriented, the new version of the ISO standards (introduced in September 2001) was oriented towards the organization, the management of knowledge and the cultural environment. Although Malia already had quality processes in place, Rabih el Darwiche needed to come up with a new organizational design and manage the requisite change to achieve the innovation goal outlined in the new ISO standards. The process of ISO certification helped the company understand its goals better. Malia realised that products should no longer be seen from a manufacturing perspective, but from a sales perspective, and that timely delivery is as important as quality manufacturing.

The first approach was to hire a well established firm of consultants from the Arab world that had been responsible for Pharmaline's certification to ISO 9001 in 1998. However, this did not achieve the necessary goal, and the firm Arthur Andersen was brought in. This firm's approach was completely different. They sent a team of three consultants, two of them with previous experience, who set up a weekly steering committee that consisted of themselves and Malia employees (including all the technical managers). Aware that the ISO standards are of general application, the consultants provided Malia with specific guidelines and requirements for the ISO certification process. An ISO certification team involving the whole company was established, with procedures written by the technical managers. The consultants trained the managers and other team members. Malia Holding's CEO was involved in the process from the start.

Although the ISO does not require any company to do so, Malia Holding attempted to measure the benefits and costs of certification. Detailed measurement, according to Mr el Darwiche, can be very costly. The most direct way to measure the benefits of certification is through exports. Reports show the evolution in benefits based on both exports and other factors. The costs of certification were three part-time assistants in addition to the Quality and Environmental Manager and salaries for other relevant Malia employees; the fees payable to the certification body; the hire of consultants for eighteen months; information systems and technology costs; and other indirect costs. Malia Trust audits the certification every six months.

Among the barriers Malia encountered was the necessity for strong commitment from the management. For ISO 14000 certification, Malia's main obstacle was the lack of relevant regulation in Lebanon, as the Lebanese Ministry for the Environment is currently restructuring the laws. Finding that appropriate Lebanese certifications were lacking, Malia followed guidelines from the World Bank and from other governmental institutions, although this was a complex and occasionally incoherent mass of information.

Change management was a complex part of the process. Managers needed to be very diplomatic, obtaining information from different people while avoiding conflict. Testing the new procedures entailed a number of trade-offs within the company, but also resulted in agreement in many cases. One example of this was a logistical problem: it was difficult to obtain information from the sales department for dissemination to other departments. The sales department would draw up production and purchasing plans, with rolling delivery of orders. All departments had to agree to change the whole value chain without bringing the system to a halt. For a transitional period, the sales department established goals and requirements, which they negotiated with the production department. One result of this was that the sales department could not submit orders for fifteen days hence but for three months hence.

4. Change management

Academic research on strategic change constitutes a substantial part of our current knowledge base on change management. Some researchers have offered theoretical frameworks for major change taking place over a period of time. In line with practitioner models of holistic change, these studies emphasize that moving to a state adapted to a future environment often requires comprehensive change in many areas, including human behaviour, culture, organizational structure, work processes and information technology infrastructure.

Change management is the discipline that ensures that organizations and employees meet new and existing performance targets swiftly and effectively. Organizations need to develop the right processes, organizational structure, culture, abilities, and opportunities for enhanced human performance so that change goals are both achieved and sustained. In essence, change management derives from two ideas. The first idea is that human performance is at the core of business performance, and it is therefore a priority for organizations that human performance should be developed; changes in this area may include consultation on processes, the restructuring of work patterns and strategic human resources management planning. The second idea is that a change process presents an organization with the opportunity to optimize its profitability, and that organizations therefore need to determine ways of managing the change process effectively to ensure that this optimization occurs; changes in this area may include the development of information technology solutions.

By this definition, the concept of change management is more far-reaching than that of organizational design, since it covers a wide range of intervention strategies intended to enhance human performance directly or indirectly. However, change management should only be seen as only one of the several components of corporate change, the others being strategy, business processes and technology. A prime objective often is to integrate these components, for example, by striving for a higher level of congruence between strategic objectives and human resource policy, or by ensuring that the information technology infrastructure supports cross-functional teams.

Until recently, individual change as a part of a wider strategic change on a corporate level has received scant attention in the theoretical literature on organizational design; the same may be said for the enabling role of information technology. Established theories, such as those of Argyris, Schein and Senge, focus only on individual skills and attitudes with little regard for the roles of organizational structure and systems. As was known more than 30 years ago: '... the major error in dealing with problems of organizational change, both at the practical and theoretical level, is to disregard the systemic properties of the organization and to confuse individual change with modification in organizational variables.'

B. JORDAN: THE IMPACT OF ISO 9000 CERTIFICATION

1. Introduction

To assess the diffusion of ISO 9000 certification in the region, the Jordan Institution for Standards and Metrology (JISM) undertook on behalf of ESCWA a field survey of Jordanian institutions certified to ISO 9000. The survey was completed by a team of JISM employees experienced in ISO 9000. A questionnaire was drawn up and used in interviews so as to obtain direct responses from the managers of the enterprises involved. A version of the survey report in Arabic is annexed to the Arabic publication of this study. The

following summary revolves around the impact of the application of the ISO 9000 standards on the performance and competitiveness of Jordanian enterprises.

2. Objectives of the survey

The JISM undertook this study to assess the impact of ISO 9000 six years after the first certificate of compliance was issued in Jordan. The sample study covered 30 industrial enterprises selected at random, including large, medium and small enterprises that have been certified for more than three years. The main objectives of the study were: to assess the impact of certification on the performance and competitiveness of certified enterprises; to identify problems faced in the process of certification; to assess the assistance provided by government institutions to certified enterprises, and to formulate tangible recommendations to amplify the benefits gained by certification. Many public institutions in Jordan are providing direct technical, financial and managerial support to industrial enterprises seeking ISO 9000 certification. Among these are: the JISM, the Higher Council for Science and Technology, the Jordan Export Promotion Institution and the Industrial Development Bank.

3. Statistics relating to ISO 9000 certification

The number of enterprises certified each year grew from 4 (in 1995) to 89 (in 2000), making a total of 365 enterprises certified by May 2001, mostly in the private sector. The distribution by type was as follows.

107	Service industries and consultancies
45	Agro-food enterprises
124	Electro-mechanical enterprises
25	Drugs and pharmaceuticals enterprises
64	Chemical enterprises

4. The principal findings of the survey

- (a) The main objective of certification for those enterprises surveyed was the enhancement of the enterprise's reputation in local and export markets;
- (b) 85 per cent of certifications were initiated by the director/owner of the enterprise;
- (c) All certified enterprises felt the benefits of certification, e.g., more rigorous job descriptions for existing employees, improved management procedures, more accurate and consistent documentation, better marketing, etc.;
- (d) Most consultancies lacked the breadth of experience and effective skills needed to prepare local enterprises for certification;
- (e) Among the more notable obstacles to certification listed were the resistance of employees to change, the scarcity of resources and a lack of requisite skills and expertise within companies;
- (f) The study recommended the establishment of a national accreditation body in Jordan (to supervise certifying companies and assess their skills) and a national quality board to institute a national quality policy and national quality award.

C. THE SYRIAN ARAB REPUBLIC: THE IMPACT OF ISO 9000 CERTIFICATION

1. Introduction

As part of its assessment of the diffusion of ISO 9000 certification in the region, the Higher Council for Sciences and Technology in the Syrian Arab Republic (HCST) undertook surveys in 1998 and 1999. A questionnaire was drawn up and used in interviews so as to obtain direct responses from the managers of the enterprises involved. The findings of the surveys were presented a paper entitled 'The National Campaign

for Quality and Support of its Infrastructures at the National and Regional Level' at the Quality Management Systems 2001 conference, which was organized by Team International in cooperation with ESCWA and held in Beirut in May 2001. The objectives of the paper were to review the status of quality in the Syrian Arab Republic, to present a national policy for quality and propose a programme for the dissemination of a culture of quality in the Syrian Arab Republic by building infrastructures for metrology, standardization, norms and testing. A version of the paper in Arabic is annexed to the Arabic version of this study. A summary of the main findings follows here.

2. Objectives of the surveys

The HCST undertook the surveys in order to assess the impact of ISO 9000 two – three years after the first certificate of compliance had been issued in the Syrian Arab Republic. The main objectives were to assess the impact of certification on performance, the competitiveness of certified enterprises and the identification of problems faced during certification.

3. Review of the current status of quality in the Syrian Arab Republic

The 1990s were a decade of serious interest in quality in the Syrian Arab Republic. In 1992, series of seminars and training workshops on quality began. In 1994, series of seminars and training workshops on ISO started. In 1995, an annual 'national quality month' was established, and publication and distribution of a free newsletter on quality was implemented. From the end of 1996 onwards, companies started to obtain certification. In 1997, a High National Committee on Quality was proposed in order to organize the activities surrounding quality issues in the Syrian Arab Republic. In 1998, the Syrian Association for Quality was proposed. In 1999, the first seminar on the importance of supporting quality infrastructures in the fields of metrology, standardization and testing was organized. In September 2000, the total number of certified companies stood at 105.

If there are five stages in the evolution of a quality programme (1 – customer inspection of goods on receipt; 2 – inspection of goods before shipping; 3 – quality department making use of SPC; 4 – process operators making use of SPC; 5 – total quality management (TQM)), then Syrian industry at the present time is mainly still at stage 2. Only a few firms have reached the stage 3, where quality control is implemented at all stages of the production process.

4. Statistics relating to ISO 9000 certification in the Syrian Arab Republic

At September 2000, the distribution of the 105 enterprises in the Syrian Arab Republic with ISO 9000 certification was as follows.

21	Construction companies
20	Agro-food enterprises
19	Pharmaceutical companies
15	Petrochemicals and plastics companies
12	Textiles and clothing companies
7	Companies in the paper industry
4	Commercial firms
2	Companies involved in public administration
5	Others, including the sugar industry

5. The principal findings of the surveys

(a) The principal reason companies gave for striving to obtain ISO 9000 certification was a desire to improve company image, thereby gaining a competitive edge. Other reasons included a desire to improve export capabilities;

(b) The main external benefit of certification was the realization that in the short term quality was not a means to increase profit margins, but a way of accessing the market;

(c) Although the certification improved the productivity of the companies surveyed, there were only limited internal benefits in the areas of training, work environment, behaviour, documentation, etc.;

(d) Companies faced great resistance from workers since they had not been involved from the initial stages of the certification process – they felt that certification had been imposed on them;

(e) Most of the certified companies do not implement ‘modern’ improvements such as quality cost analysis, problem-solving techniques, the organization of workplace, dissemination of knowledge on the functions of quality, and total quality management.

III. HOW FAR HAVE UN-ESCWA MEMBER COUNTRIES COME IN TERMS OF ISO 9000: 2000 AND ISO 14000?

The success of the ISO 9000 series of standards continues to grow, and the number of countries where ISO 9000 is being implemented has increased. At the end of December 2000, at least 408,631 ISO 9000 certificates had been awarded in 158 countries. This is an increase of 64,988 over the end of December 1999, when the total stood at 343,643 for 150 countries. If we examine the ESCWA region's share of the total number of certificates for each of the last ten years (expressed as a percentage), according to the ISO, the Middle East and Africa are still a way behind Europe, though they are experiencing a huge growth in number of certifications (ISO Survey of ISO 9000 and ISO 14000 certificates 2001).

	Africa/West Asia	Europe
31.01.93	3.42	83.02
30.09.93	2.73	81.12
30.06.94	2.64	78.73
31.03.95	2.75	75.61
31.12.95	2.65	72.72
31.12.96	3.79	67.58
31.12.97	3.88	64.34
31.12.98	4.47	61.16
31.12.99	5.04	55.36
31.12.00	4.94	53.87

Rapid progress is being made in Lebanon. Two large companies obtained certification recently: Afak, a general contractor, and Water Resource and Development, a construction company. They follow hard on the heels of giants such as Cellis, one of the two telecommunications companies in Lebanon. According to Grissom (Daily Star 7/11/01), the demand for ISO certification in the region is high. He says: 'In Lebanon – and this statistic is six months old – only one half of one percent of the companies have ISO ...' Grimmson notes that the situation is similar in the Syrian Arab Republic, and that Jordan is further ahead, as are the Gulf countries: 'All small companies, not just big ones, have to think globally now.'

IV. RECOMMENDATIONS

Taking what has been outlined about the QMS ISO 9000 and EMS ISO 14000 into account, we may see that it is important to promote certification in three directions.

1. Greater awareness. We have seen that the barriers to and benefits from the standards are widely unknown in the ESCWA region. It is hoped that this study will increase awareness and therefore promote positive reactions from organizations.
2. Creation of virtual communities. We have seen that such ISO certifications as have been obtained in the ESCWA region were the results of initiatives undertaken by individuals, and that organizations do not cooperate with each other in terms of implementation or maintenance of certificates. Information and communication technologies provide a potentially powerful infrastructure to sustain forums and virtual communities, and thus cooperation is a key factor in creating the necessary conditions for certification through the whole industries value chain.
3. Provision of consultants. We noted in the ESCWA region a lack of management consulting firms available to help organizations with certification. Without this expertise, organizations find certification too much effort, too expensive and too complex, even if the benefits in their respective sectors are clear.

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TABLE 1. A MODEL OF THE RELATIONSHIP OF ITEMS IN PROFIT AND LOSS STATEMENTS
AND EXPENSES AND PROFITS OF ISO 9000 CERTIFICATION

TABLE 2. ESTIMATED EXPENSES OF CERTIFICATION AND
MAINTENANCE (AN ELECTRIC DIVISION
IN COMPANY A).

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Figure II. ISO categories and related standards

Figure III. EMS principles and auditors' involvement

Figure IV. COSO provisions in an EMS