

Challenges and benefits of implementing an Environmental Management System: A review

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Abstract

Environmental awareness among the industries is increasing due to various factors like; customer requirements, market pressure, companies image, social responsibilities, operational efficiency etc. Number of companies getting certified with ISO 14001 is increasing day by day. During implementation and maintenance of this management system, industries are facing various challenges which includes availability of time and resources, corporate attitude, company's working environment. On the other hand, after successful implementation of EMS, an organization can achieve benefits like reduction in manufacturing cost, increased compliance with legal requirements, customer satisfaction, improved company's image and environmental management cost etc. In the present study, various research studies carried out are reviewed and identify the various challenges which industries face during implementation as well as benefits which industries draw by implementing the environmental management system based on the requirements of ISO 14001.

Keywords: Environment Management System; EMS; ISO 14001; Challenges; Benefits

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1. Introduction

Environmental management system (EMS) standards ISO 14000 are developed by international organization for standardization (ISO). ISO 14000 is not a standard but it represents the family of environmental management standards ranging from environmental labelling to assessing the life cycle of the product [1]. These standards are designed and developed to help the organizations to establish management processes which can control and improve their environmental performance through minimizing or eliminating the environmental impacts of their activities, products and services and to reduce legal risks by ensuring compliance with legal and other requirements related to environment. These standards also facilitate the organizations to evaluate and improve their environmental performance [2, 3, 4].

ISO 14001 is the only specification standard in the family of ISO 14000 which is used for certification purposes through third party [5]. This standard provides a frame work for establishing and improving an EMS. ISO 14001 standard is made up of five key elements as Environmental policy, environmental planning, implementation and operation; checking and corrective actions and management review [6, 7]. This international standard was first developed in 1996, in line with ISO 9001, a quality management system standard, to facilitate the organizations to integrate both the systems [7]. Generally ISO reviews each standard after five years for its adequacy and relevance. After review new edition of ISO 14001 came in 2004 (ISO).

Due to various factors like customer requirement, market pressure [8], social image, strategic decision of the management etc., number of organizations implementing and certifying with this standard has increased from 30,300 in mid 2001 [9] to 1,88,815 firm in 155 countries at the end of 2009

[10]. Commitment of organizations to conserve natural environment and resources has become an important variable within current competitive scenario. Business led initiatives such as development of firm structured environment management systems, participation in trade association programmes, emphasizing code of environment management and adoption of international certification standards for environment management are becoming wide spread [11, 12].

Importance of an Environment Management System for organizations is becoming widely known across all the industrial sectors [13]. The implementation of EMS has become an important activity for organizations, irrespective of their size, sector or nature of the business. Some organizations decided to adopt EMS due to the external pressures like governmental regulations, community participation and market demand [14, 15]. On the other hand, some studies show that the major motive for an organization to implement EMS is to improve their corporate image [14]. Even though all organization have different motives in adopting EMS because the ultimate aim of implementing EMS is to help organizations to establish a systematic way to introduce environmental issues into every aspects of the company's operation, and offers an organized approach to manage these issues [16, 17, 18].

It is a general consensus that ISO 14001 registration may enhance the competitive advantages of the organizations [19]. A survey of executives at 115 large North American business found that 61% expected meeting ISO 14001 to bring potential competitive advantages [20]. Benefits achieved through implementation and certification is directly tangible and intangible. Benefits from implementing EMS can be categorized as internal benefits and external benefits [21]. SMEs found numerous financial, competitive and business

rewards from adopting formal EMS. Key benefits for SMEs are the attraction of new business and customers. Apart from the commercial benefits, organizations have also found positive outcomes of implementation of EMS in terms of improved environmental performance [22, 23], assuring legal compliance [23, 24] and energy and material efficiency [25, 26, 27].

The present review study focuses on the requirements of Environmental management system, challenges during implementation and benefits from implementation of this management system.

2. Family of ISO 14000

ISO 14000 is not a standard but it represents the family of standards related to Environment Management. These standards can be categorized into two classes as:

2.1 Process Oriented Standards

These are those standards which are related to processes. These can be further sub divided into three categories as:

2.1.1 Environmental Management System

Examples of EMS are ISO 14001:2004 and ISO 14004:2004.

2.1.2 Environmental Performance Evaluation

Examples of EPE are ISO 14031:1999 and ISO 14032:1999.

2.1.3 Environmental Auditing

Examples of EA are ISO 14015:2001 and ISO 19011:2002.

2.2. Product Oriented Standards

These are those standards which are related to product or product life cycle. These can be further sub divided into three categories as:

2.2.1 Life–Cycle Assessment

Examples of LCA are ISO 14040:2006, ISO 14044:2006, ISO 14047:2003, ISO 14048:2002 and ISO 14049:2000.

2.2.2 Environmental Labelling

Examples of EL are ISO 14020:2000, ISO 14021:1999, ISO 14024:1999 and ISO 14025:2006.

2.2.3 Environmental Aspects in Product Standards

Example of EAPS is ISO 14062:2002.

3. The key elements of ISO 14001

ISO 14001 is based on Total Quality management (TQM) business concepts of continuous improvement, or PDCA (Plan, Do, Check and Act) cycle (adopted from Matsuo and Nakaharab, 2013) [28] as given in Fig. 1.

3.1. Environmental policy

It is the commitment of top management for prevention of pollution, compliance with legal and other requirements related to environment and continual improvement through setting and meeting objective and targets.

3.2. Planning

This includes the analysis of the environmental aspects of organization's all activities, products and services. Identification of legal and other requirements is related to environment to which the organization subscribes. Environmental objective and targets to be set are based on the significant environmental aspects of the organizations.

3.3. Implementation and operation

This includes the defining of clear cut roles and responsibilities of employees. A system should be developed for identifying training needs and provide training. A structured mechanism should be established for communication within the organization and outside the organization for various environmental issues and environmental performance of the organization. All necessary documents should be prepared and controlled. Operational control procedures should be developed and implemented for all the significant aspects of the organization. An emergency plan should be prepared, implemented and tested frequently.

3.4. Checking and corrective action

Checking and corrective action include the monitoring, measurement and recording of the characteristics and activities that can have a significant impact on the environment.

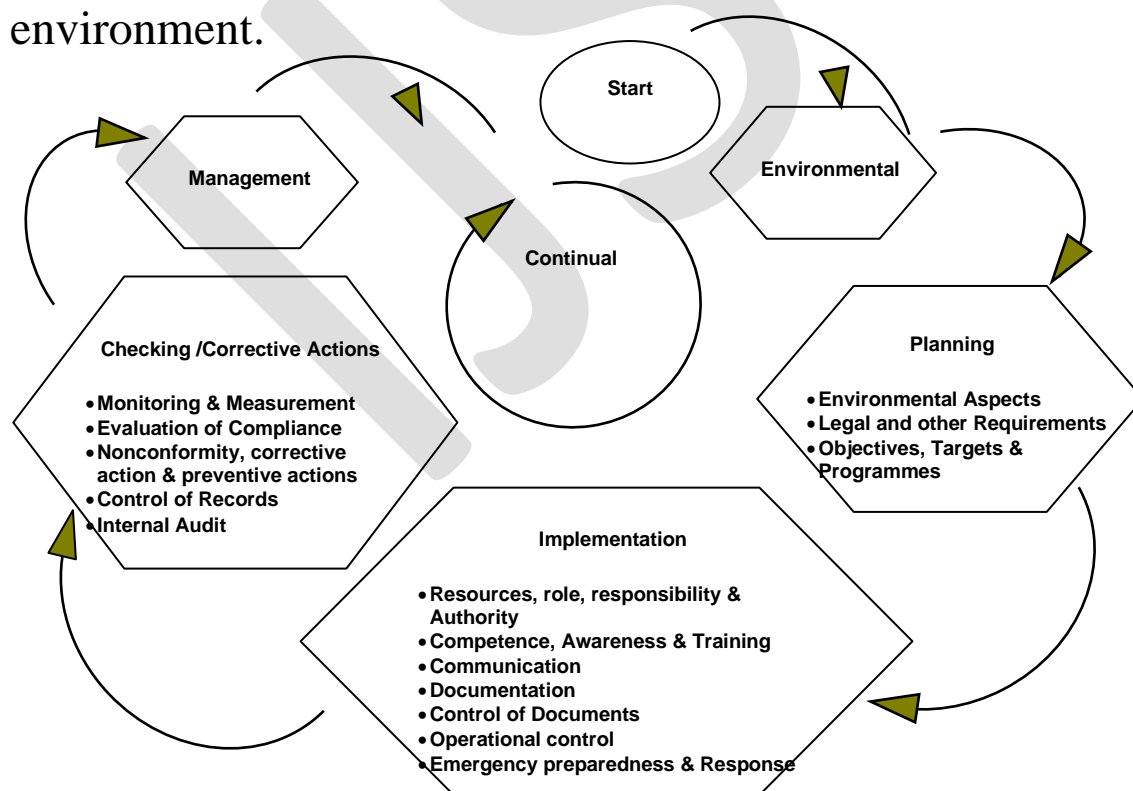


Fig. 1. PDCA (Plan, Do, Check and Act) cycle [adopted from 28]

It also includes the evaluation of compliance with legal and other requirements related to environment. All the record should be controlled to ensure their protection from damage, retrievably. Regular internal audits should be conducted to ensure that the organization is complying with all the requirements of the system.

3.5. Management review

Review of the EMS by the organization's top management at a defined frequency to ensure its continuing suitability, adequacy and effectiveness.

3.6. Continual improvement

The concept of continual improvement is a key component of the environmental management system; it completes the cyclic process of plan, implement, check, review and continually improvement.

4. Challenges in Implementation of ISO 14001

4.1. Time

Due to various factors such as customer pressure, top management decision or for new business it is desired to get certified within minimum time. Time required for designing, implementation and certification may vary from six month to two years depending upon the size and complexity of organization's processes (ISO information centre 1996). A survey result of 177 companies of US shows that most of companies (75.6%) took 8 to 19 months to obtain the certificate. The minimum reported time to obtain the certification was only three months (only 3 respondents) while maximum time was more than 20 months (only 10 respondents) [6].

Similarly study carried out in Spain found that most of the companies (85.4%) took time between 12 months to 20

months [29]. It shows that total time required for implementation and certification do not vary up to great extent from country to country.

4.2. Human Resources

Competent manpower is required for implementing any management system. In depth knowledge of requirements of standard is prerequisite for implementation of system. It is observed that availability of competent manpower is a major constraint during implementation of this management system. Studies also show that human resources are the major barriers in implementing the system [30, 41, 45]. This system requires the cross functional working of employees. Lack of cross functional nature working of employees is another barrier for organization during effective implementation of EMS [38, 24]. Another factor is unawareness of employees about benefits from implementation of EMS [26, 30, 31]; which leads to less involvement of employees.

4.3. Financial Resources

Implementation and certification of EMS require high cost. Cost of implementation and maintenance of system includes manpower cost, training cost, compliance cost, documentation cost, monitoring of key environmental parameters like air, water etc while certification cost includes registration cost, third party certification audit cost and surveillance audit cost etc. Study shows 'high cost of implementation and certification' is the greatest implementation problem [6].

Certification cost may vary from country to country. Various countries are promoting certification by providing incentives to Small and Medium Enterprises (SMEs) [32]. Changing fortune faced by SMEs alters their priorities and

pushes the environment to the bottom of the list, further depressing interest in ISO 14001 [22, 32].

4.4. Documentation

Industries experience shows large documentation which includes development of manual, procedure, operation control procedures, emergency plan and other formats, checklist, records etc., require more time to develop. Review, updation and control of documents require more efforts if organization's size is large. Study shows that it is very difficult to document all the requirements in terms of procedures, manual, OCPs etc and their effective control [6]. Another study shows that a lot of documents, written procedure, checking, control forms and other paper works are involved in order to meet the requirements of ISO 14001 [33, 34].

4.5. Corporate Attitude

Corporate attitude and company culture also play an important role in successful implementation of EMS. Study shows sometime due to negative attitude of corporate and unfavourable company culture create a climate that deprives the EMS implementation process [22, 23, 35, 36]. Similarly inconsistent top management support becomes a hindering factor in implementation of EMS [30, 32].

4.6. Understanding and Perception

Sometime practical difficulties like; how to identify the environmental aspects and their associated impacts; how to evaluate significance of environmental impacts etc. reduces the momentum of implementation [22, 24, 37, 38]. Similar study of US companies shows identification of environmental aspects requires greatest efforts as compared to other requirements [6]. Understanding the requirements of elements

which requires additional guidelines is also a hindering factor for the organizations.

4.7. Stakeholder pressure

SMEs are subjected to a variety of stakeholder pressures related to their environmental performance and their adoption of EMSs. A review study sought to identify which stakeholders influence SME behaviour in the adoption of formal EMSs [21]. In the review study, 22 studies identified stakeholder pressures experienced by SMEs of which 16 studies identified key stakeholders as drivers for the adoption of EMSs and six studies identified the stakeholders that are influencing SMEs' attitudes towards environmental performance [39]. The stakeholder identified, as one of the main drivers for the adoption of a formal EMS is the customer [40, 41, 42, 43]. Customer and supply chain are also prominent in driving SMEs environmental improvements [30]. However, the regulator and local authorities exert greater influence on the general environmental performance of SMEs, in particular medium-sized enterprises, than customers [26, 42, 44, 45].

5. Benefits of implementing ISO 14001

Benefit arises from implementing environmental management systems can be tangible or intangible or can be categorized as internal benefits and external benefits.

Internal Benefits are the positive outcomes from the implementation of an EMS which relates to internal operations of the organization while external benefits are positive outcomes from the Implementation of EMS which relates to the external factors like customer satisfaction, company's image, and new business from existing or new customers and cost saving through improved company image etc.:

5.1. Reduction in operation cost

A properly designed and implemented EMS can trigger procedural or technological changes, and as a result can reduce the operational costs and improve the value of a product. Studies shows that implementation of EMS allows the organizations to reduce the consumption of various natural resources like raw material, energy, oil, water and reduction in generation of waste like scrap etc. which results in the decrease in overall cost of manufacturing [46]. Similarly experience from Austria, Netherlands, Sweden, and the UK show that manufacturing environmental-friendly products or services will not necessarily increase business/operation costs; on the contrary, because of the better use of resources, a company's manufacturing costs can be reduced [47]. These overall business/operation costs, including the direct and indirect costs, are generally measured by the following five sub-factors: Process Cost, Material Cost, Labor Cost, Production Overhead and Administrative Expenses.

5.2. Company image

Implementation of EMS is a strategic decision of any organization. Implementation and certification from third party built a good image among their customers. Implementation of EMS is also being accepted as an image builder and for strengthening organization's competitive position [48, 49]. Such certifications also attract new customers and marketer [50].

ISO 14001 registration may have a beneficial impact on the firm's relationships with its shareholders and other investors [51, 52]. ISO 14001 could become a requisite for business loans, participation in World Bank and other financial institution projects as well as governmental funding schemes. The standard will have an effect on bankers who

will use ISO 14001 registration as an indication of a company's environmental performance record in order to grant loans and debt [53]. Study in Sweden reported that most significant benefit of implementing ISO 14001 is improved corporate image [14]. Another study also shows implementation of ISO 14001 in an organization improves company image [33].

5.3. Customer satisfaction

Implementation of EMS gives confidence to customers. Studies show that integration of EMS with Quality management system increases product quality and hence leads to customer satisfaction [54, 55]. Study carried out in Australia and New Zealand shows that most significant benefits experienced by company is fulfillment of customer expectations [56]. Similarly study also shows increase in customer satisfaction by implementing Environmental management system [33].

5.4. Market trend

Increasing market force has increased the ISO 14001 registration gradually. The organizations are implementing this system to meet the requirements of international trade and avoid multiple permits/certifications [57]. Specifically in automobile industries almost all large manufacturers has requirements that their tier 1 supplier should have EMS or have to meet specific environmental requirements. Hence this certification became a tool to meet these specific requirements [58].

5.5. Compliance with legal requirements

EMS facilitates the organizations to identify the various applicable legal requirements and other requirements like customers, neighbour organization, society, municipality etc.

and compliance with these requirements. Legal compliance is documented and can be demonstrated [7]. Further regular third party audits and internal audits facilitate the organization for compliance. Increased compliance with these requirements reduced the legal risk for the organization hence build a confidence in the organization. EMS implementation may actually improve a firm's compliance management and enhance its ability to maintain regulatory compliance [4].

5.6. Involvement of Employees

EMS facilitates the organizations to identify the training needs of employees and fulfil those gaps through trainings. Study shows that overall training provided to employees of EMS implemented organization has increased [59]. Training improves the competence and awareness level of employees to do activities in such a manner so that they have no or least impact on environment. Implementation of EMS also improves the morale of employees and hence trigger innovations in the organization [27, 60] and provide a forum for dialogue between staff and management [21]. Study shows that employees want to do the right thing in the correct manner but need to be made aware of the opportunities and methods available and be endowed with the appropriate level of resources and responsibility [61].

5.7. Environmental conservation

The main objective of the EMS is to minimize the impact of organization's activities, products and service on environment. The organization can use various performance indicators to track its performance like Waste Reduction, Waste Reuse, Waste Recycle, Waste Treatment and Use of Sustainable Resources. Studies show that there is a significant reduction in the consumption of natural resources.

5.8. Environmental management cost

Reduction of environmental management costs, that is reduction in hazardous waste disposal costs [62] reduction of fines and penalties, reduction of environmental liability: the risk of liability may be minimized by ISO 14001 registration, since a firm will be better prepared to demonstrate that they took necessary precautions and, finally, reduction of litigation expenses. Materials savings that may be traced back primarily to more complete processing, materials substitution, materials re-use or recycling [63]. Reduction of other operating costs that means essentially energy savings, reduced material storage and handling costs, reduced packaging costs, lower insurance premiums since insurance coverage may be more easily obtained and on better conditions by businesses that have a confirmed environmental management system [64].

Conclusion

ISO 14001, a member of ISO 14000 family, is a specification standard developed by international organization for standardization (ISO) based on PDCA cycle. EMS provides a structured approach to implementing organizations to effectively control the impacts arising from its processes, products and services. Number of organizations implementing and getting certified with EMS is increasing day by day.

Organizations implementing this management system face many challenges during implementation and maintenance of this management system. Key challenges are time, cost of implementation, maintenance and human resource. As per various studies, implementation and certification time vary from six month to two years. This much of time becomes a difficulty for the organizations due to market/customer pressure. Cost incurs on the implementation and maintenance of EMS becomes a major obstacle for the organization. Some

time if organization fails to demonstrate compliance with the requirements of EMS leads to reassessment of the organization and it will further add cost. Cost is very important specifically for SMEs. Availability of competent manpower is also a key challenge for organizations. Unavailability or limited availability of competent manpower for implementation of system, hiring cost and their retainment cost increases for organization. Apart from these key challenges, other challenges which an organization faces are preparation and maintenance of documents, corporate attitude, stakeholders' pressure, understanding of requirements and organization's perceptions for those requirements.

Implementation of EMS also provides various benefits in form of tangible and intangible. Most tangible benefit is achieved through manufacturing cost reduction. It leads to reduction in consumption of various natural resources like raw material, water, energy etc. Simultaneously also reduces the generation of waste from the processes. Cost of waste management like collection and disposal of hazardous waste, treatment of domestic and trade effluent and treatment of air etc. Implementation also leads to increase the compliance with legal and other requirements related to environment which ultimately reduce the risk of fines from the regulatory authorities. Increased customer satisfaction by meeting their specific requirements leads to new business from existing and new customers. Implementation of EMS also improves the organization's image and leads to competitive advantages. Other benefit is involvement of employees in improvement activities within the organization. Involvement of employees in improvement also leads to increase their morale.

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