

Literature survey and its Review for the Development of performance measures and Evaluation for The Environment Management in Indian Industries.

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Abstract: With the rise in the public concern on environmental protection, more Indian industries start to apply environmental management for their activities. As a result, Environmental Management Systems has needed to be implemented in Indian industries. The literature has indicated various sets of requirements for corporate environmental management in Indian industries. But no study has yet identified and statistically established the reliability and validity of a set of critical factors for Indian industries. This paper aims to develop and validate a set of critical factors of environmental management. Using a thorough synthesis of the environmental management literature the authors identified a set of critical factors. Performance measures for each of these Factors were developed through literature review. A survey methodology was used; statistical computing package Minitab 16 is used to establish reliability and validity. That could be used by the managers in assessing and improving their own environmental management practices

Key Words: Environmental Management System, critical Factors, performance Measures

I. INTRODUCTION

Environmental management refers to the management of modern human [society](#) with, and its impact on, the environment. Because natural resources are finite and limited, they can only support a certain population within any species. Environmental management works on the principle of conservation of the environment in order to sustain human development. Because of the complexity of the environment and its interconnected nature with all species, environmental management incorporates both living and non-living components of the environment. In other words, both biological and physical aspects of the environment are considered, relationships within the human environment, like social, cultural or economic issues, are also considered. Environmental Management System (EMS) is a structured, documented approach to respond to environmental challenges by focusing on environmental regulations and standards, and customer requirements. Environmental management involves conducting a life-cycle assessment of the process at hand, seeking ways to lessen environmental burdens discovered, and then optimizing the use of limited natural resources utilized. An EMS can provide managers with a predictable structure for managing, assessing, and continuously improving the effectiveness and efficiency of the management of their environmental activities. An EMS approach builds in periodic review by top management and emphasizes continuous improvement instead of crisis management

India's rapid growth in industrialization has its impact on the environment; this has now become a major concern to the economy. The government, concerned about economic development and raising the standard of living of its people, has actively supported the development of the small enterprise sector. Due to their labour intensity and importance in generating employment opportunities, they have been encouraged and given assistance by the Indian government. However, small enterprises tended to be the worst polluters and, they gave the least attention to environmental issues as part of their operations. Reasons for not installing pollution-control equipment were related to the fact that such expenditure did not affordable for these industries. But exactly reverse in the case of many multinational and large scale industries, as they operate according to a company-wide policy or set of principles worldwide, and therefore have a strong beneficial impact on environmental management in the countries in which they operate. Experience has shown that the international practices of multinationals and large scale industries spread good environmental management practices to joint venture partners, suppliers, and contractors in all areas where such practices are applied

The goal of environmental management is to find effective ways to use limited resources. The products and services are to be produced in an environmentally conscious way. EMS attempts to create, reinforce and improve a sound environmental policy through a cycle of planning, implementation, checking (involves monitoring and taking correcting action), and review. The cycle of "plan--do--check--act" moves towards continual improvement.

II. LITERATURE SURVEY

The review of literature on critical factors mentioned in Table No.1 which reveals that various authors have indicated a number of requirements for corporate environmental management, which are based either on

examinations of current best practices of corporate environmental practices or the authors' personal experience. By closely examining a summary of the works of these authors, there seems to be a set common Critical success factors of environmental management. The process of deriving the critical factors of environmental management includes an Exhaustive literature review of the factors that have been suggested by various authors.

The literature review was performed by collecting articles from various journals, and various popular research related sites namely Science Direct, IEEE, Emerald and also various free articles from the internet. The literature reveals that various authors have indicated various sets of requirements for corporate environmental management but no study has identified and statistically established the reliability and validity of a set of critical factors for Indian industries. It aims to develop and validate a set of critical factors of environmental management for Indian industries that could be used by the managers in assessing and improving their own environmental management performance.

The articles related with environmental management were found to be distributed along a time period spanning from 1979 to 2016 with a majority of papers written after 2014. The articles can be categorized into three parts: those providing the details of critical success factors related with the environmental management, second which gives the detail idea of environmental management and third which provides information related with various tools and techniques used for further analysis. A majority of papers were found to fall in the entire category.

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The following authors are also discussed about the Environmental Management.

Gupta Mahesh C. (1995): He draws parallels between striving for total quality and environmental management. The zero defects in environmental management. He also emphasizes the importance of having a corporate environmental policy. It is argued that to be effective, the policy must have the full support of the board of directors. To implement the corporate policy, top management must have the total involvement of employees. He also stresses the importance of information management and environmental audits.

Dechant and Altman (2011): They examine the best practices of firms that are successful at managing environmental issues and identified five common practices. They also emphasize that in order to manage change better, it is necessary to conduct Assessments of environmental projects, manage human resources; employees share the Common vision and are empowered to act on it. They suggest that adequate training will also be needed for employees to avoid costly environmental mistakes and to increase environmental awareness.

Newman and Breeden (2014): They developed a model comprising of three steps that are essential for a successful corporate environmental program. The three main steps are:

- Setting the vision by identifying critical capabilities.
- Designing the blueprint for organizational excellence.
- Creating the processes for achieving continuous improvement.
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Hunt and Auster (1990): They identified seven elements that a proactive company should have with regard to environmental management. They also suggest certain business practices to improve effectiveness of environmental management, such as environmental risk assessment, calculation of costs of poor environmental Management.

Quazi et al. (2011): They simplified the essence environmental management into two basic goals: Reducing waste and maximizing resource efficiency. They further introduced six key concepts of environmental management, classifying those under two main sections: Rationale and Process. Under rationale two key concepts were classified: i.e. Economics. and Enforcement. Under process, they introduced four key concepts i.e. Empowerment, Education, Efficiency and Excellence.

Ramlinga H, Murthy S et al. (2008): They suggested that the manufacturers should compliance with regulations, potential legal findings of financial liability for environmental damage and increasing customer scrutiny of environmental effects related to product manufacturer should made the environmental factor a key strategic variable with implications for the design of products, the design of processes and operating procedures

Wellford (2013): He suggests that for any company committed to improving its environmental performance, the starting point must be to make a clear statement of that commitment through an environmental policy. Appropriate organizational structures must also be set up with clear lines of authority and communication channels. All activities of the organization should be identified and documented. Environmental audits and reviews need to be carried out. The environmental impact of products must be evaluated via life cycle assessments.

Jai Barny (1991): He says about the complexity in the environmental management arena is increased with the imposition of constraints and uncertainties and additional considerations that range from “compliant with regulations” to “proactive” regarding the environment. Many organizations have been seeking to improve their environmental performance as a result of operational need and various regulations.

Nazim U.Ahmed et al. (2015): according to these authors, the better environmental performance can be achieved when environmental aspects are systematically identified and managed. Also they suggests that the goals of implementing EMS, are nothing but the expanding the TQM philosophy and practices that emphasize continuous improvement, meeting customers' requirements, reducing rework, long-range thinking, increased employee involvement and teamwork, process redesign, competitive benchmarking, constant measurement of results, and closer relationships with suppliers

Linda C. Angell , Robert D. Klassen (1995): according to these authors, the firm should focused on the various operations in manufacturing, where strategic resources are combined and environmental technologies are implemented, for this purpose a firm should form a mechanisms that will consider both environmental management and multiple performance out- comes.

Sime Curkovic (2003): according to him the environmental management influences the supplier's environmental programmes and ability to meet environmental specifications. For this he gives the example of military, military specifications and standards have an extensive influence on global manufacturing practices and component selection practices. Also he says that the integration of environmental and purchasing concerns can have the effect of reducing life-cycle costs, reducing environmental and health risks, and thereby liability risks.

Table No.1: The set of critical factors suggested by authors for Environmental Management.

Name Of The Author	Suggested Critical Factors														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Badri, M.D. and Davis, D. (1995)	√	√	√	√					√		√		√	√	√
Berry & Rondinelli (1998)	√	√	√				√	√	√			√	√		
Brammer S., Pavelin S. (2006)	√		√		√	√		√		√		√	√	√	
Campbell, D. and Fiske, D. (1989)		√		√					√		√		√	√	√
Carmines, E. and Zeller, R. (1979)	√	√	√			√			√		√		√	√	
Chen, C-M., Montes-Sancho, M., (2006)	√	√		√		√			√			√	√		
Christmann P. (2000)	√		√		√		√				√		√	√	
CurkovivSim (2002)	√			√			√					√			√
Dechant & Altman (2011)		√	√						√			√	√		
Garrod B, Chandwie P (1996)	√	√	√	√						√			√		
Gerde V.W., Logsdon J.M. (2013)		√	√			√			√		√		√		√
Govindrajalu N, Daily B F (2003)	√	√		√		√			√			√	√		
Griffin, J., Mahon, J, (2014)		√		√		√		√	√			√	√	√	
Hair, J., Anderson, R., Tatham, R. (1995)			√		√							√		√	
Halkos, G. and Evangelina, K. (2002),			√			√				√			√		√
Hunt C & Auster C (2013)			√		√							√	√		
J Schot, E Brand K Fisher (1997)	√		√		√		√			√	√			√	√

- 1. Top Management Support
- 4. Employee Training
- 7. Benchmarking
- 10. Suppliers Management
- 13. Quality Management

- 2. Quality Policy
- 5. Process/Product Design
- 8. Process Management.
- 11. Technology Utilization
- 14. Quality Improvement System

- 3. Employee Involvement
- 6. Product Quality
- 9. External Interface Management
- 12. Measurements Strategic

III. Conclusion

The objective of the Present study is to identify and validate a set of such factors using appropriate Statistical techniques. The identified set of critical factors consist of some factors which helps the main constituents of the system on which the whole environmental management system has to work, they are top management, employees and the end users nothing but costumers. The sub parameters mentioned in the above mentioned in three main factors are helpful for analysing their roll in assessing the environmental management system in their industry.

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