

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 sustain human development.

Because of the complexity of the environment and its interconnected nature with all species, environmental management incorporates both living and nonliving 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

Adopting the methodology used by Quazi et al (2005) in the field of Environmental Management, 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

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

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

III. METHODOLOGY

3.1 Development of Survey instrument (Questionnaire)

3.2 Data Collection

IV. DATA ANALYSIS

4.1 Reliability Analysis

Table 2: Cronbach's alpha and other parameters

V. CONCLUSION

The various factors on environmental practices proposed by different authors were organized into a set of seven critical factors of environmental management and performance measures for each of the critical factors developed In our study, the Cronbach's alpha for all multiple item scales are from 0.691 to 0.702 as listed in Table. it indicates good reliability of this study.

Statistical tests showed that the seven critical factors identified were valid. With reliability and validity established, the items under the seven critical factors of environmental management should be able to act as gauging measures of performance for firms.

Since being ISO 14000 certified means that a firm should have at least an environmental management system in place, ISO 14000 certified firms are expected to score higher on the above-mentioned performance measures Therefore, statistical tests were performed to see whether ISO 14000 certified companies scored higher than Non-certified firms based upon the performance measures developed.

To test this proposition, the scores of all performance measures under all seven critical factors were averaged. Based upon this average score, a Z -test was carried out, From among the 56 respondents, no company was ISO 14001 certified.

Based on Z Test carried out for individual factors, considering 95% level of confidence, it shows that the entire Hypothesis should be rejected.

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Table No.1 :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)	√		√		√		√				√		√	√	
Curkoviv Sim (2002)	√			√			√					√			√
Dechant & Altman (1996)		√	√						√			√	√		
Garrod B, Chandwie P (1996)	√	√	√	√						√			√		

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|---------------------------|----------------------------------|--|
| 1. Top Management Support | 6. Product Quality | 11. Technology Utilization |
| 2. Quality Policy | 7. Benchmarking | 12. Measurements |
| 3. Employee Involvement | 8. Process Management | 13. Quality Improvement System |
| 4. Employee Training | 9. External Interface Management | 14. Strategic Quality Management |
| 5. Process/Product Design | 10. suppliers Management | 15. Customer environmental Orientation |

Table 2: Cronbach's alpha and other parameters

Factor	No. of items	Mean	Std. Deviation	Cronbach's Alpha
Product/Process Design	7	3.36	0.710	0.702
Supplier's Management	10	3.10	0.817	0.691
Employee Training	8	2.85	0.850	0.701
Employee Involvement	7	2.39	0.878	0.691
Top Management Commitment	11	3.01	0.725	0.692
Quality Policy	7	2.59	0.704	0.679
Customer Environmental orientation	4	3.01	0.790	0.686
Total / AVG.	54	2.901	0.782	0.691