



## INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE AND MANAGEMENT

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**ENVIRONMENT MANAGEMENT SYSTEM IN INDIAN FOOD PACKAGING INDUSTRY: VARIABLE IDENTIFICATION AND SELECTION****ARCHANA SHEKHAWAT**

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**ABSTRACT**

Post-Liberalization era has proved that traditional regulatory approaches regarding environment protection has become incapable to attain the decided objectives. Developing Countries, India, in particular has weak norms and regulation regarding environment. Environment management practices in India these days have been limited to acquiring accreditations and present themselves as green in the market without actually knowing about the term "Environment Management". This paper is part of authors research work. It presents research gaps in the area of Environment management System (EMS) through the process of literature survey and also identifies the critical variables and discusses the methodology to develop a holistic model EMS in Indian Food Packaging, in particular.

**KEYWORDS**

Environment management, Food Packaging, Environment management System.

**INTRODUCTION**

Being "green" has resulted upon thought towards the environmental issues in corporate organization these days. Consumers are attracted by the term environment friendly. Due to superficial practices the main purpose behind the whole concept is not served. Environment Management (EM) is not just phrase rather it is "managing interaction organization, society and environment". The need for EM can be viewed from the various perspective. The common philosophy and impetus behind EM is the concept of carrying capacity. Carrying capacity refers to the maximum number of organisms a particular resource can sustain. The concept of carrying capacity, whilst understood by many cultures over history, has its roots in Malthusian theory. Environmental management is therefore not the conservation of the environment solely for the environment's sake, but rather the conservation of the environment for humankind's sake. These types of practices need to be carefully planned executed and monitored so as to achieve the goal of environment management. Advantage of adopting the environment management in business has been mentioned in number of empirical studies. For instance, improved manufacturing performance (Klassen and Whybark, 1996), enhanced profitability (Russo and Fouts, 1997). Klassen and McLaughlin (1996), substantial and tangible benefits (Quazi, 1999), emergence of organizational capabilities (Sharma and Vredenburg, 1998). Factors are identified in literature Berry and Rondinelli, 1998; Epstein, 1996; Cairncross, 1995; Makower, 1994; Dechant and Altman (1994); Newman and Breeden, 1992; Hunt and Auster, 1990), all these are concentrated to manufacturing industry; no work has been yet reported on Indian food packaging Industry. This paper aims development and validation of a set of critical factors of environmental management. Furthermore, it has also been observed that no performance measures for such critical factor have been reported. Review of the extant literature and it analyses together with expert inputs has form the basis of variable identification and selection This paper is an attempt develop an holistic model of environment management system for food packaging industry. Details of research questionnaire design, sampling plan and scale refinement & validation methods has been discussed .

**LITERATURE REVIEW**

The requirements of successful environmental management practices proposed by various authors are briefly described below.

Kit-Fai Pun (2002) has emphasized on flexible adaptation of the framework can help organizations derive potential benefits from the EMS implementation leading to sustainable competitive advantage.

Berry and Rondinelli (1998) has identified six critical factors in order to create an effective proactive environmental management system. This research emphasized the role of a champion within the company in assuming responsibility for environmental issues. He should be equipped with superior management skills and have a influence within the organization with the authority to allocate adequate resources to environmental management. Furthermore, environmental goals and targets should be both clear and measurable. Decentralization is required to ensure commitment to environmental policies. Everyone associated with the business must be involved in environmental management,

including suppliers, customers and employees. Training and education programs are thus essential for employees. An environmentally proactive company should also engage in monitoring, auditing and reporting its environmental performance.

Epstein (1996) identified ten elements of corporate environmental integration review of internal and public documents of more than 100 leading corporations and interviews with more than 30 company representatives. These ten elements, which range from development of a corporate environmental strategy to the final implementation, appear to concentrate on the availability of appropriate systems for corporate environmental strategy implementation.

Yee Soo Wee(2003) has done illustration, through reliability and validity analyses , of seven critical factors , they are – top management commitment to environmental management, total involvement of employees, training, green product/process design, supplier management, measurement, and information management .

Hunt and Auster (1990) 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 likewise.

There has been continual imposition of regulations and legislation (Goddard 1997) in the packaging supply chain in order to reduce the environmental impacts associated with packaging. Mechanisms include the banning of certain types of materials and packs (e.g., Danish can ban); introduction of quantitative recycling targets (e.g., European Directive for Packaging and Packaging Waste); and implementation of taxes and deposit systems (e.g., beverage containers in South Australia). Regulations have been a means by which governments have enforced requirements upon industry to improve its environmental performance. Along with advances in technology and improved information, industry has been able to improve its management of discharges to air, water and land (Gibson 1999). Regulations can have a positive influence on reducing environmental emissions, discharges and waste that industry generates, though as Porter and van der Linde (1995) suggest it can also deter the benefits of innovations if not designed correctly, therefore, reducing the opportunities for resource productivity and competitiveness. Regulations addressing solid waste generation from packaging materials are in place throughout the world. Examples include the Packaging Covenant in the Netherlands enforced since 1991, the Japanese Packaging Law enforced since 1995 (Hunkeler *et al.* 1998), and the European Directive of Packaging and Packaging Waste, which has been in force since 1995 (Perchard 1997). Another regulatory measure is the collection, by governments throughout the world, of emission data from companies, which can be accessed publicly. Audit records, in addition to showing compliance with the regulations, can at other times also act as a certificate, which can be used for accreditation and marketing purposes

Margaret (1999) found in his paper that in the food and retailing sector only around 25 per cent of companies were found to operate wastes minimization programmes. This paper aims to demonstrate the benefits of wastes minimization, in both financial and environmental terms, for the food and drink sector. Large multiprocess food and drink companies have found they can make annual savings of greater than one per cent of turnover by implementing wastes minimization strategies.

M.Ruhul.Amin has suggested that ISO 14001 certification cannot serve as an end in itself for industries as peer companies under voluntary compliance may exceed environmental performance. Minimum acceptable environmental standards could be enforced through industry-wide consensus. Public access to performance indicators can be ensured under a voluntary mandate; peer benchmarking may allow for competitive goal setting. The model proposed could be gainfully replicated particularly in developing countries

Gonzale (2008) found a positive relation existed between the possessions of certified EMS, specifically ISO 14001 and eco-management and audit scheme, and the environmental demands that these organizations impose on their suppliers. This finding implies that environmental concern spreads upstream in the supply chain. The environmental demands on suppliers increase with customer organization size, but the degree of internationalization, measured by the rates of imports and exports, does not show a significant relationship to these pressures.

Arpanutud (2009) had presented the results hypothesis testing indicated that the adoption of a food safety management system can be significantly predicted by: expected gain of social legitimacy; expected gain of economic competitiveness; perceived importance of external stakeholders (government, community, food safety organizations, and media); top management commitment to food safety; firm size and amount of export sales. It can also be predicted by the extent to which firms exchange food safety knowledge with other stakeholders.

Thorough analysis and synthesis of literature has resulted into eleven variables. These variables are latent variables which cannot be measured directly. For eg: Life cycle perspective and assessment for environmental management cannot be measured directly. Therefore Life cycle costing is a manifestation of Life cycle perspective for environmental management. Now, for further study, each manifestation is measured with an item in scale. Now a scale achieves content validity when the items in a scale sufficiently span the scope of the variable. In this study, content validity of the variable was achieved through literatures review and expert inputs for the selection of their representative items. For developing theory, the performance measuring instrument should be reliable, viable and indicative which should be backs by hard core evidence based on meticulous methodology. The above review of literature on critical factors reveal 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 the above-mentioned studies, there seems to be a set common critical success factors of environmental management in firms. In Indian context the studies and limited to manufacturing and allied industry. The objective of the present study is to identify and validate a set of such factors for environment management system in Indian Food Packaging industry using appropriate statistical techniques in food packaging. Research gaps in the area of development of EMS framework for Food packaging industry were identified. The following specific objectives were selected to fill the research gaps:

***To identify the critical factors to implementation of environment management system in Food Packaging Organization (FPO) in particular and validate them to develop a holistic model for Environment management System.***

Since there is no straight forward and easy way to define environment costs and implementation methods to achieve environmental management and more on in food packaging industry to identify the critical factors for the organization wide implementation need a stout methodologies. The critical key issues like Current and future environmental issues, environment accounting, environmental cost allocation, environmental reporting and management system, voluntary agreement, life cycle perspective and assessment can be used as guidelines for implementation as well as performance criteria. In general, environment performance measurement provides organizations about the current practices, assumption and beliefs to develop a system which overcome their shortfall in existing system. Therefore it is crucial to identify 'critical success factors' for EMS in food packaging industry. The process used in this study to develop measures of the critical factors of

environmental management is the systematic research methodology in the social science emphasizing generation of theory from data in the process of conducting research.

#### QUESTIONNAIRE DEVELOPMENT

Based on the literature review, a tentative list of critical factors of environmental management was developed. These factors are summarized in Table 1. The measurement items under each critical factor were identified based on the literature review and expert input. A total of 69 items were developed under the eleven critical factors. The interviewees further suggested that the items were more suitable for manufacturing firms. The questionnaire was finalized by rearranging the various items. Respondents were asked to rate each item under a five-point interval rating scale (1=not at all, 2=little extent, 3=moderate extent, 4=large extent, 5=very large extent), to indicate the extent of practice in their respective organizations. The level of practice of environmental management in an organization was assessed by the average ratings of the measurement items for each factor which is consistent with the methodology adopted by Saraph *et al.* (1989) in their study on critical factors of quality management.

#### DATA COLLECTION

The Sample population for the study consisted of 350 organizations listed as major food and packaging companies in trade India online directory for Indian manufacturers. The environmental health and safety manager or senior persons such as managing director or Chief executive officer (where the post of environmental health and safety manager doesn't exist) were contacted. Since the information are at private and confidential level in company, so the consent for not revealing the identity was given by researchers to company. The target persons were contacted and given questionnaire personally and through email. Out of 350 it was possible to obtain 150 filled questionnaires, out of them only 126 was analyzed as rest 24 were not considered for analysis as they were missing or the substantial data. After number of follow up through telephone calls it was possible to get a return rate of 36 % (126 responded out of 350).

#### DATA ANALYSIS

##### RELIABILITY ANALYSIS

This analysis has been carried out in SPSS 16 version. In our analysis, before assessing the internal consistency of measure, an inter item correlation matrix is also been created and table presents the mean inter item correlation. Values of each variable inter item correlation show that all of them are adequate enough to be included in the list. Variables have cronbach alpha value range from 0.7295 to 0.9315 which shows that the high acceptability level of the variables form the extensive literature review. The instrument can be said statistically reliable and homogenous in nature.

##### VALIDITY ANALYSIS

The first step to establish the internal consistency validity, the mean score and standard deviation of all items within a scale were first examined. Followed by this there should be a face and content validity analysis which is presented in the following section. This particularly refers to the goodness of fit of item within the scale. To sustain the Item internal consistency Validity, these values should be roughly equivalent for all items within the scale.

##### FACE VALIDITY

Face validity is a property of a test intended to measure something. It is the validity of a test at face value. In other words, a test can be said to have face validity if it "looks like" it is going to measure what it is supposed to measure. Through literature review and expert comments such insights are possible and further the systematic analysis of the whole concepts and measure of environment management system it was possible to arrive at useful measures. High degree of face validity was obtained further through expert as well as academician's opinion.

##### CONSTRUCT VALIDITY

Factor analysis is usually used to identify items, which should be included in a consistent measuring instrument (Muttar, 1985). Appropriateness of the factor model is determined by examining the strength of the relationship among the variables. Correlation matrix, Barlett's test of sphericity and Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy are the three measures recommended in the literature for this purpose (see Hair *et al.*, 1995; Norusis, 1994).

##### CORRELATION MATRIX

Correlation matrix shows the correlation values between the items in each factor shows greater than 0.3. This concludes the commonality of factors under items of factors. (Hair *et al.*, 1995; Norusis, 1994).

##### BARLETT'S TEST OF SPHERICITY

Barlett's test assesses the overall significance of the correlation matrix. If the value of the test statistic for sphericity is large and the associated significance level is small, it can be concluded that the variables are correlated. Barlett's test of sphericity demonstrated sufficiently high values for all the eleven critical factors (at  $p < 0.000$ ).

##### KMO MEASURE OF SAMPLING ADEQUACY

The test result shows factors ranging from 0.7256 to 0.9661, which is much above the suggested minimum standard of 0.5 required running factor analyses (Hair *et al.*, 1995; Norusis, 1994). Hence, based on the above tests, it is concluded that all eleven factors are suitable for applying factor analysis.

##### FACTOR ANALYSIS

Principal Component Analysis with Varimax Rotation Factor analysis was conducted on items under each critical factor. Each factor was tested for Unidimensionality and out eleven nine were found one-dimensional and rest two split into sub factors. A total of seven analyses were carried out. The number of factors to be extracted in each analysis was determined by the Eigenvalue number of factors will be extracted in accordance to the number of Eigenvalue over 1. This means that items hypothesized under these 6 of the 7 factors each formed into a single factor. Next, an analysis of the factor loading was performed. The factor loading represents the correlation between the variables and their respective factor. The squared loading of each variable is the amount of the variable's total variance accounted for by its factor. Based upon the sample size, factor loading is considered to be significant if they are greater than  $\pm 0.45$  (Hair *et al.*, 1995). The factor loading of all the items under factors, 2, 3, 5, 6, 7, 8, 9, 10 and 11 have met the above criteria, with the lowest loading at 0.623. For factor (construct) 1 & 4, Environmental Accounting: three sub-factors and Life Cycle Assessment: two sub factors emerged from the analysis.

## FINDINGS

The various factors on environmental practices proposed by different authors were organized into a set of eleven critical factors of environmental management and performance measures for each of the critical factors developed. With reliability and validity established, the items under the eleven critical factors of environmental management should be able to act as gauging measures of performance for firms. All the factors are highly correlated.

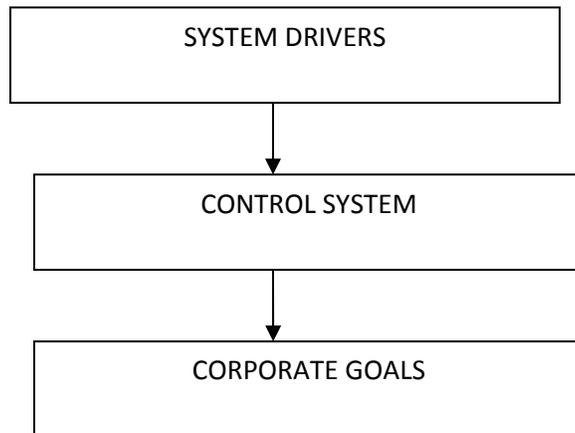
## DISCUSSION

For the decision making regarding important environmental issues and strategies, the managers require a valid instrument to measure the environmental performance of their company and improvise with the changing scenarios. The present research aimed to develop an integrated EMS Framework to achieve a standardize level of environmental management in food and packaging industry. The specific objective were: to identify the critical factors to implementation of environment management system in Food Packaging organization(FPO) in particular, to develop an empirically tested reliable and valid performance measurement instrument for EMS in FPO, to propose an integrated framework for EMS for the target industry. The analysis included the internal consistency using cronbach alpha reliability coefficient and item analysis (descriptive statistics), Kaiser-Meyer Olkin (KMO) Measure of sample adequacy ad construct validity for checking the Unidimensionality of the factors with the help of Principle component Analysis. The Labeling of the sub factor emerged from the factor analysis was done using Delphi Technique. Further, the relationship between these eleven variables was analyzed using Pearson bivariate correlation base on the rating of environmental performance on each variable in comparison to the actual level of implementation in the industry. A positive correlation among these variable showed that these variable are interrelated and can be combine d in a holistic manner in order to propose an integrated framework of Environment Management System. Finally, a conceptual integrated framework for EMS with eleven variables in Food Packaging Organization. Those variable and their sub factors that form the holistic model are:

System Drivers: Environmental Accounting: Environmental policy management(EPM); Account Management(AM); Environmental Control System(ECS), Employee involvement(EI)

Control System: Commitment of Top management(CTM);Environmental Cost allocation(ECA);Life cycle Assessment: Life cycle management(LCM); Product and Process Design and Improvement(PPDI);Regulatory Issues(RI)Current and Future Environment Issues: Sustainable energy issues(SEI); Employee health and related issues(EHRI);Environment reporting(ER);Training(T);Information management(IM)

## PROPOSED HOLISTIC MODEL FOR EMS FRAMEWORK



## IMPLICATION OF RESEARCH

The research has identified a comprehensive list if eleven factors for EMS management addressing the entire range of environment management dimension in food packaging organization. The strength of EMS framework is based upon an extensive literature review and a synthesis of academic and practitioner quality management literature in food and packaging as well in other industries also. Multidisciplinary approach was adopted so as to strengthen the subject of theory building was used as because of the limited empirical research in the context of environmental management in food packaging organization. An integrated framework for EMS implementation has been proposed explains the relationship among the variables.

This particular research is a sincere attempt to add the environment management context in Indian food packaging industry as compared to other countries. This would hereafter provide the future researchers and practitioners of with information in the field of environment management practices.

## LIMITATION

The major limitations of the study:

Factor analysis has resulted in sub factors of the variables. Therefore possibility of perplexing of factors in those variables is there.

Self-reported information from the respondents has formed the basis of development measure. The items in the questionnaire are subjective in nature. Respondents had rated the items based on their perception, as to the extent to which the items were applicable in their respective companies. Hence, the lack of objective measures might introduce certain amount of bias into the data collected. This study covered only food and packaging industries in India. To test the wider validity of the instrument, similar studies may be undertaken across a larger number of industries. Further, to test the robustness of the instrument studies may also be carried out in different countries.

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## TABLE

TABLE 1

Information management	Life Cycle perspective and assessment	Measurement	supplier management	Process/Product design	Training	Employee involvement	Top management commitment
	Life cycle assessment (LCA) examine the potential environmental aspects associated with a product or service by compiling an		supply chain is a global network of organizations that cooperate to improve the flows of material and information between suppliers and customers	Product and process development	Awareness program for employees regarding environment.		Involvement of top peoples into decisions related to environment
Information system to set best practice of EMS	Measures set to gauge the environmental issues	Environmental performance as criteria to choose supplier	Designing product and process in a way to minimize the environment impact.	Employee being trained to understand their environmental responsibility	Setting of green team to encourage employee involvement	Setting of vision mission policies by top manager regarding environment	
Using information to reevaluate environmental program	Measurable goals, target and environmental audit.	Supplier involvement And assessment	Training And Education Program	Participatory decision making by employee in environment management.	Top Management Leadership, Appointment of Senior officer as environment champions		
Integration of existing management systems	Identification of aspects and impacts and setting of objectives and targets	General training and awareness for suppliers and other stakeholders	Learning from other organizations' experiences and benchmarking. Employee induction and training		Top management leadership and support is vital Appointment of a champion has been identified as a key role for top management		
	System for measuring the various aspects of EMS				The management attitude can be understood by examining the top management commitment and support, appropriate environmental policy and regular management reviews.		
Internal and external reporting system	Internal and external environmental auditing system, costing system Capital budgeting System.	Put pressure on suppliers to reduce negative impact of inputs	Integrating environmental concerns into product design system, Life cycle analysis, Waste reduction through product and process assessment	Empowerment, Company environmental awards, Establish individual environmental goals	Develop and implement environmental strategy, Corporate mission statement		
Integrating the environmental information into EMS	Measuring tangible and intangible cost	Assessment of food packaging supply chain	Green product design		Role of environmental managers in assessing the impact of their activities		

Critical Factors	Corporate Social Responsibility	Regulatory Issues	Environment Accounting
Kit-Fai Pun,2002	Social responsibility towards society	Compliance issues	Environment Audits and Internal audit
Yeo Soo Wee,2003			
Berry and Rondenelli, 1998	CSR initiatives		
Ambika Zutshi,2004			Necessity and usage of audits
Kwai-Sang Chin(1999)	Address issues related to CSR		
Epstein 1996			
James Karles (2003)	Responsibility towards the societal impact	environmental legislation and environmental specialist assistance	

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