

Assessing the Impact of Environmental Management System on Organizational Performance using Structure Equation Modeling

Dr. Shikha Goyal¹, Dr. Geeta Rani²

¹Assistant Professor, PDM University, Bahadurgarh, Haryana, India

¹Associate Professor, Faculty of Management & Commerce, Jagannath University, Delhi, India

Abstract

The purpose of this paper is to study the impact of factors of Environmental Management System on Organizational Performance in ISO certified Indian manufacturing companies as perceived by top and middle level executives of the organization who were completely aware about EMS implementation. A questionnaire was administered to 160 employees from 40 manufacturing companies implementing Environmental Management System (EMS) in Delhi-NCR region. Based on literature review, nine dimensions were identified related to Environmental Management System and four dimensions of Organizational Performance. In order to validate the scale and test the model confirmatory factor analysis and structure equation modeling was used, using AMOS software. The results revealed that there is a significant impact of factors of Environmental Management System on Organizational Performance in ISO Certified Companies.

Keywords: Environmental Management System, Environmental Performance, Financial Performance, Organizational Performance, Operating Performance, Structure Equation Modeling.

1. INTRODUCTION

Environmental issues are commanding major attention in industries due to environmental regulations and market pressures. The firms are becoming more proactive for the environmental side effects of their operations by implementing Environmental Management system. An environmental management system provides the company a framework to achieve its environmental objectives. The comprehensiveness of an organization's EMS can be measured by examining its diverse environmental practices (Khanna and Anton, 2002). International standards organization (ISO) has laid down certain basic structural elements of an EMS such as: Establishing an environmental policy according to the organization requirements, facilitate planning, monitoring and controlling, identify legislative requirements, determine environmental impacts, maintain appropriate communication etc. Studies reveal that EMS not only helps the firm to improve its environmental performance but also overall organizational performance. Organizational performance is multifaceted. For our research, the impact of EMS on Organizational Performance could be addressed on different aspects as: Environmental Performance, Operating Performance, Financial Performance and Overall Business performance.

EMS does not mandate a particular level of organizations environmental performance. It just describes a system which can help an organization achieve its environmental objectives. It is believed that if an organization focus on every stage of its manufacturing process, it will implement better EMS and surely improve its environmental performance. Numerous studies reveal that adoption of environmental

management system enhance environmental performance (González et al., 2008; boiral, 2012; Melnyk et al. (2002, 2003); Zutshi and Sohal, 2004; Morrow and Rodinelli, 2002; Potoski and Prakash, 2005). The various environmental performance indicators are: air emissions (CO₂, SO₂ etc), solid waste generation, raw material usage, energy usage, water usage, soil contamination, environmental risks and incidents etc.

EMS demands that organizations should control the operational activities that have a significant impact on the environment. The nature of these activities varies from industry to industry. But majorly the generic operational measures identified through various studies are: cycle time, lead time, quality and cost, efficiency, flexibility, overall productivity, product innovation, process optimization (Melnyk et al. (2002, 2003); Perez et al. (2009); Boiral and Henri (2012); Jabbour et al. (2013) ; Zutshi and Sohal, (2004)) which could be valuable to the customer and give company a competitive advantage. Other attributes could be waste reduction through product/service or process design to deliver better products and services. (Sroufe, 2000). It helps to perform more of recycling activities and more use of recycled products in order to reduce cost and increase the relative benefits associated with it.

Environmental management system focus on processes involved in elimination of pollution and does not ensure particular performance standards. It is just a system which can help the organizations to achieve its environmental objectives and in turn leads to enhancement in organizational performance; as waste reduction leads to less pollution (environmental component) and cost savings (business component). Therefore, EMS provides opportunities of reducing costs and increasing revenues.

Thus, whether the presence of ISO certified EMS system would enhance the organizational performance of Indian manufacturing firms is carried out by means of following hypothesis.

Hypothesis: There would be significant positive impact of factors of Environmental Management System on Organizational Performance in ISO Certified Companies.

2. Review of Literature

2.1 The Factors affecting Environmental Management System Implementation

Environmental Issues Identification: There might be many environmental issues of concern for a firm but it has to identify those needing immediate attention. This would enable them to concentrate on most essential ones like identification of activities having potential impact on business (Padma et al., 2008; Khanna, 2010).

Legal Compliance: There are legal procedures that firm have to comply with. An organization should identify and pay attention to all applicable legal requirements and accuracy in keeping track of all changes related to its environmental aspects. (Padma et al., 2008; Khanna, 2010).

Environmental Process Management: Design production or business processes in such a way that it minimizes adverse impact on environment. Processes are examined to reduce the amount of waste, energy consumption and emissions, recycling activities are carried out to ensure full usage of resources (Gawaikar et al. (2017); Padma et al. (2008)). The companies use filters and standardized reusable packaging to ensure environmental management (Melnyk et al. (2002, 2003); Gonzalez et al. (2008)).

Emergency Preparedness: Firms might face various environmental hazards (for example leakage of hazardous elements, mixing of polluted water with pure water, etc) which have dire consequences.

Hence it is imperative that they plan for emergencies and provide adequate facilities to respond to possible environmental accidents. (Padma et al. (2008); Lopez-Gamero (2009))

Measurement: Objective quantifiable measures are laid down to enhance the level of environmental performance. Periodic internal and external audits are carried out to ensure compliance with environmental goals (Wee and Quazi (2005), Berry & Rondinelli (1998)).

Monitoring: It is a systematic process of collecting and analyzing information to track the programme progress to attain its objectives. It focuses on process performance parameters to identify variations if any (Padma et al., 2008).

Control: It is an important function as it helps to check the different errors and take corrective actions wherever required so that deviations from standard performances can be minimized and the organizations can achieve its objectives in the desired manner (Padma et al., (2008)

Continual Improvement: ISO states that an organization should aim to enhance its existing systems in order to realize improvements in overall environmental performance in line with its environmental policy (Hart (1995), Sharma and Vredenburg (1998). It should emphasize continuous improvement in all operations and at all levels as it is a never-ending journey where once the set targets are met; new ones must be set for achieving higher levels of product, process and service efficiency.

Supplier Management: While managing suppliers companies use environmental performance as one of the criteria for evaluating suppliers. Pressurize the suppliers to reduce their negative environmental impacts of inputs. Environmental expectations of the companies are communicated to the suppliers. The companies educate the suppliers with respect to environmental issues and involve them in product development phase. Environmental audits are carried out by the companies on their suppliers (Wee and Quazi, 2005)

2.2 Factors affecting Organizational Performance

Perceived Environmental Performance: ISO 14031 defines environmental performance as “an organizations success in managing the relationships between its activities, products or services, and the natural environment” (Jacob et al., 2010). Thus, the ability of manufacturing facilities to reduce air emissions, effluent and solid wastes, decrease resource consumption, toxic emissions and industrial pollution will improve environmental performance (Rikhardsson, 1998; Zhu et al., 2008; Molina-Azorin et al., 2009). As the measures are complex and there is lack of availability of data mostly self –report measurements are often used. Perceived environmental performance is often employed (Daily et al., 2007; Melnyk et al., 2003).

Perceived Operational performance: The performance related to organizations internal operations, such as productivity, improved product quality, cost, lead time, speed etc. Jabbour et al. (2013), Melnyk et al. (2002,2003), Atkin et al. (2012)). It is an indicator of how firms effectively utilize its production and operations system to meet its organizational objectives. It is considered to be an important measure of organizational performance.

Perceived Overall Business Performance: The enlarged domain of performance related to non-financial and overall business such as improved corporate image, enhanced employee morale, improved market position, strong brand image etc. (Zutshi and Sohal, (2004), Darnall et al. (2000), Padma et al. (2008))

Perceived Financial Performance: Financial performance refers to the importance of the pecuniary outcomes resulting from business activity. It gives an indication of how effectively an organization uses its resources and meets its goals. It can be measured through cost savings on waste reduction, sales growth, market share and that too only through manager's perception (Christman (2000), Claver et al. (2007), Darnall et al. (2008)).

2.3 Studies on Environmental Management System and its impact on Organizational Performance

Ahmed Aqeel et al. (2021) found that lean and ISO 14001 is an integrated approach for maintaining environment performance in the meat industry. A joint implementation strategy of ISO 14001 operational practices with lean tools and techniques enhanced positive environment performance.

Fuzi et al. (2021) prepared a conceptual framework to study the relationship between Environmental Management System and organizational performance in Malaysian manufacturing industry through literature review and has proposed that EMS could have a significant impact on Organization performance. The conceptual framework can serve as a guide for future research.

Murmura Federica et al. (2021) confirmed that certification of EMS positively influences the environment management of a company and highlight the heterogeneous effects of an EMS which get affected by company profile. Additionally, EMAS certification practices provide internal benefits to companies that put into practice it.

Zimon Dominik (2021) highlights the benefits of implementing more and more environmental certifications which will not only be beneficial to the organizations but will bring new possibilities of economic growth to the entire industries.

Chukwuka and Eboh (2018) investigated the effect of green business practices on organizational performance. The research was carried out in manufacturing companies of Nigeria to determine the extent to which green business practices affects the firm's productivity. The data was collected from middle and lower-level cadre through stratified sampling. The results revealed that there was significant positive impact of green business practices on the manufacturing firm's productivity.

Cheng et al. (2013) examined the relative effects and inter-relationship effects of three types of eco-innovation i.e. process, product and organizational and its impact on business performance. After having a focus group discussion with 12 participants a list of 20 eco-innovation items were generated, including five items measuring the eco-process construct, eight items measuring the eco-product construct, seven items measuring the eco-organizational construct, four items measuring business performance. The questionnaire was administered to a sample of 121 firms collected from Taiwan Environmental association. Structural equation modeling was used. It was found that eco-organizational innovation had the strongest effect on business performance. Moreover, eco-process and eco-product innovations partially mediate the effects of eco-organizational innovation. Eco-product innovation mediates eco-process innovations effect on business performance. Business performance was directly or indirectly affected by the three types of eco-innovations.

Nishitani et al. (2012) studied the relationship between environmental management system and its effect on both environment and business. The authors analyzed whether voluntary approach to implementation of environmental management system, simultaneously reduced firms' environmental impacts and improved its productivity. Data was obtained from 500 Japanese manufacturing firms for 2002-2008

from different sectors. Descriptive statistics revealed that implementing an environmental management system reduced environmental impacts and improved productivity i.e., reducing environmental impacts improved productivity. But the direct effect of environmental management system on productivity was conditional. This led to the conclusion that the relationship between implementation of environmental management system and productivity improvement was not strong.

Green et al. (2012) analyzed the impact of green supply chain management practices on environmental and organizational performance from manufacture's perspective. The various constructs included in the study are: Internal environmental management, Green Information systems, Environmental collaboration with suppliers, environmental collaboration with customers, Environmental monitoring of suppliers, Environmental monitoring by customers, Environmental performance and Organizational performance. Data was collected from 159 managers of manufacturing organizations. An environmental collaboration and monitoring performance model was theorized and assessed following a structural equation methodology. It was found that environmental collaboration and monitoring practices among supply chain partners lead to improved environmental and organizational performance.

Vries, et al. (2012) studied the extent to which implementation of ISO 14001 has contributed to sustainability and also whether implementation is only expenditure or a source of business benefits. Out of the 29 papers that addressed business impact, 25 report positive impact, 2 neutral impact and 2 negative effects. These benefits include better operations and a competitive advantage in the market. 13 studies pay attention to both environmental and business impacts. Ultimately it was concluded that an ISO 14001 environmental management system in general leads to business benefits that outweigh the cost of implementing the system.

Lun (2011) investigated the relationship between green management practices and firm performance. A green management practices model was proposed, consisting of the key elements of green management practices and firm performance indicators. Hutchinson Port Holding was selected as the case to illustrate the application of the proposed Green management practices model in a real life situation. The key elements of green management practices were cooperation with supply chain partners, environmentally friendly operation and internal management support. The results revealed that green management practices of the case firm consist of these three elements. The results also verified the positive relationship between green management practices and firm performance as the case firm had good performance in terms of terminal throughput, profitability and efficient and cost-effective operations.

Lämsiluoto and Järvenpää (2008) conducted a longitudinal and qualitative case study approach to analyze the forces that prompted a Finnish food manufacturing company to implement environmental management system (EMS) and performance management system (PMS). The initial driving force was to obtain an environmental certificate. But when a link between improving environmental performance and profitability was recognized than company implemented PMS and integrated it with EMS. Environmental factors were integrated into balanced scorecard.

Claver et al. (2007) studied the relationship between environmental management and economic performance. Firm performance was understood in terms of environmental performance, competitive advantage and economic performance. Case study was used as the research methodology for this work. COATO farming cooperative based its environmental practices on prevention logic rather than end-of-pipe technology and had experienced a positive effect on environmental performance. It led to the

development of new organizational capabilities for innovation, newer competitive opportunities, improved brand image and finally an improvement in firm performance.

Sebhatu and Enquist (2007) examined in Sweden a company Flugger AB that has undergone a comprehensive transformation in order to implement environmental quality standard ISO 14001 over a period of ten years and found that it can be an effective tool for sustainable development and value creation

Melnyk et al. (2003) conducted a study by drawing data from North American managers regarding their attitudes towards EMS and ISO 14001. The study found the relative effects of having a formal uncertified EMS as compared to having a certified EMS system. The results reveal that firms in possession of a formal EMS perceive impacts well beyond pollution abatement and see positive impacts on many dimensions of operations performance. Firms having certified EMS system experience a greater impact on corporate performance than the firms without certification. Moreover, experience with these systems over time results into a greater impact on selection and use of environmental options.

Table 2.1: Showing Literature Summary of impact of EMS on Organizational Performance

Papers	Studied the impact of EMS on following factors	Findings
Agan et al. (2013), Green et al. (2012), Green (2011), Yang et al. (2011), Gonzalez et al. (2008), Claver et al. (2007), Potoski and Prakash (2005), Melnyk (2002, 2003).	EMS and Environmental Performance	Positive impact of EMS on environmental performance
Jabbour et al. (2013), Atkin et al. (2012), Boiral and Henri (2012), Perez et al. (2009), Zutshi and Sohal (2004), Melnyk et al. (2002, 2003), Sroufe et al. (2000)	EMS and Operational performance	Positive impact of EMS on operational performance
Christman (2000), Darnall et al. (2008), Lopez-Gamero et al. (2009), Cheng et al. (2013), Claver et al. (2007), Green et al. (2012), Judge and Douglas (1998), Karagozoglu and Lindell (2000), Melnyk et al. (2003), Watson and Emery (2004),	EMS and Financial performance	All studies showed Positive relationship but Watson (2004) does not show significant difference in EMS adopters and non-adopters
Zutshi and Sohal (2004), Darnall et al. (2008), Padma et al. (2008), Yang et al. (2011), Morrow and Rondinelli (2002)	Overall Business performance	Positive impact of EMS on overall business performance
Li, Y. (2014), Llach et al. (2013), López-Gamero et al. (2009), López-Gamero et al. (2010), Gill et al. (2001), Russo and Fouts (1997)	Environmental Performance and Financial performance	Positive impact of environmental performance on financial performance
López-Gamero et al. (2010) Melnyk et al. (2003), Rao and Holt (2005), Berry and Rondinelli (1998), Russo and Fouts (1997), Kuhre (1995).	EMS, operating performance and Financial Performance	Positive impact of EMS on operating performance which enhances financial performance. Operating performance enhances overall business performance.

3. Research Methodology

3.1 Research Design

In order to achieve the objectives a questionnaire was developed for measuring the perception of Environmental Management System and Organizational Performance of top and middle level managers of manufacturing companies who were involved in EMS implementation. Total (40) companies were selected for the administration of questionnaire in Delhi-NCR region having ISO 14001 certification.

3.2 Sample and Data collection

The sample included President, Vice President, CEO, GM, Environmental Managers, Production Managers, Quality managers. The annual turnover of the company included in survey was above 10 crores. A sample of 160 associates were taken, 40 associates from top level management and 120 associate from middle level management who were involved in Environmental Management System implementation.

4. Data analysis and Interpretation

A questionnaire was developed and standardized based on factors identified through literature review. Based on literature review, nine dimensions were identified related to Environmental Management System such as: Environmental issues Identification, Legal Compliance, Environmental Process Management, Emergency Preparedness, Measurement, Monitoring, Control, Supplier Management and four dimensions of Organizational Performance such as Environmental Performance, Operational Performance, Overall business Performance, Financial Performance. A questionnaire containing 97 items was constructed out of which, 55 items pertained to Environmental Management System and 42 items were for Organizational Performance.

Content validity of the questionnaire was established through 5 experts from industry and academia. This questionnaire was then administered to 100 associates working at top and middle level. The data was further subjected to confirmatory factor analysis.

This study proposes to develop and validate the construct Environmental Management system in Indian manufacturing firms. The second order construct of Environmental Management System was measured with the help of nine related, first order factors. The measurement model was designed using AMOS software and confirmatory factor analysis was applied in order to test the reliability and construct validity (convergent as well as discriminant validity) of the EMS factors.

The measurement model of EMS constructs along with their statements is represented below in table 4.1.

Table 4.1 : Regression Weights EMS factors

		Construct Name	Unstandardized Estimate	Standardised Estimates	Standard Errors	Critical Ratio	P Value

Extent to which my company identify the organizational activities having potential environmental impact	A1	Environmental Issues Identification	1.000	.871			
Extent to which my company's policies & objectives are based on knowledge about those activities and their environmental impact	A2		.599	.635	.060	9.925	***
Extent to which my company establish processes to deal with the questions of environmental aspects related to organizational activities, product or services	A3		.620	.632	.063	9.860	***
My company takes proactive measures for environmental protection issues	A4		.723	.747	.059	12.284	***
Identifies various relevant legal and other requirements like environmental laws, permits, licenses etc.	B1	Legal Compliance	1.000	.742			
My company pays attention in order to keep track of legal and other requirements.	B2		1.245	.869	.087	14.332	***
My company keeps accuracy in tracking changes to legal and other requirements	B3		1.015	.746	.083	12.160	***
My company makes effective use of environmental manuals	C1	Environmental Process Management	1.000	.664			***
My company continuously assess the processes necessary to attain the environmental objectives	C3		1.310	.819	.124	10.575	***
Environmental objectives are quantified and recorded in terms of accomplishment	C4		1.402	.801	.135	10.385	***
My company has accessibility to documents whenever required	C5		.914	.638	.107	8.514	***
My company gives importance to recycling activities	C7		1.178	.743	.121	9.736	***
My company practices waste reduction	C8		1.212	.784	.119	10.196	***
My company redesigns products/ processes to eliminate any potential environmental problem	C9		1.351	.848	.124	10.893	***
My company replaces a material which can cause environmental problems with another material which is not problematic	C10		1.224	.749	.125	9.803	***

My company reduce the level of material/components within products which cause environmental problems.	C11		1.201	.780	.118	10.150	***
Wastes are segregated at the point of generation for further disposal.	C12		1.133	.722	.119	9.500	***
My company displays the details of agencies providing Emergency support.	D1	Emergency Preparedness	1.000	.893			
Procedures exists for responding to potential accidents and other emergencies.	D2		.429	.529	.045	9.628	***
My company carries out regular mock drills for emergency preparedness.	D3		.756	.758	.047	16.085	***
Performance of operational processes are as per stated policies and procedures	E1	Measurement	1.000	.795			
My company evaluates the performance of processes with respect to stated policies and procedures	E2		.875	.851	.088	9.940	***
Objective measures are established to gauge the level of environmental performance.	E4		.947	.739	.103	9.152	***
Procedures for regular calibration and testing of measuring and monitoring equipment and systems.	F1	Monitoring	1.000	.849			
Presence of objective and verifiable environmental performance indicators for the organization	F2		.659	.683	.044	15.142	***
Identification of corrective actions to remedy non- conformances	F3		.677	.754	.039	17.511	***
Take corrective actions for non-conformance to environmental policies and procedures immediately.	F4		.809	.833	.039	20.575	***
Use of statistical and quality control techniques for evaluating production/service processes	G1	Control	1.000	.858			
Use of statistical techniques to analyze the defects.	G2		1.010	.853	.054	18.840	***
Use of statistical techniques for analyzing the non-conformity to environmental procedures.	G3		.850	.758	.055	15.452	***
Extent to which the top management feels that continual improvement results in competitive advantage	H1	Continual Improvement	1.000	.690			

Extent to which quality is built in 'right' at the design stage of new products/services.	H3		1.170	.678	.110	10.647	***
The effectiveness with which the company encourages the employee contributions for improving quality and operational performance.	H4		1.227	.725	.108	11.352	***
Emphasize continual improvement in all operations and at all levels.	H5		1.360	.802	.109	12.487	***
Extent to which company uses data and statistical techniques for continuous improvement.	H7		1.700	.838	.131	13.010	***
Continuous monitoring and improvement of environmental quality and procedures.	H8		1.541	.806	.123	12.548	***
My company assesses the environmental performance of suppliers while purchasing goods and services.	I1	Supplier Management	1.000	.786			
Environmental performance used as one of the criteria while choosing a supplier.	I2		.999	.906	.060	16.506	***
My company evaluates supplier's environmental record.	I3		.778	.735	.062	12.611	***
My company gives priority to the purchase of less harmful components or products.	I6		.645	.604	.065	9.967	***

A questionnaire containing 54 items of EMS was constructed initially which were then subjected to measurement modeling and only 40 items were retained as mentioned above in Table 4.1.

The result of the measurement model comprising the nine environmental management factors indicated that the p value of the entire critical ratio was found to be less than 5 percent level of significance. Therefore, with ninety five percent confidence level it can be concluded that all the statements of environmental management practices included in the study significantly represented the related factors/constructs. The results of CFA also indicated that the standardized regression coefficients (construct loading) of different statements related to environmental management practices were found to be more than 0.5. Hence, it could be concluded that all statements of environmental management practices had significant correlation with their respective construct. Therefore, convergent validity of all the included statements of the environmental management construct was ensured.

In the study the Pearson coefficient of correlations between different pairs of the environmental management construct was also estimated. The correlation as measured by coefficients of Pearson Correlation between different environmental management factors is shown below in table 4.2:

Table 4.2: Pearson Correlation between different environmental management factors

Variable	1	2	3	4	5	6	7	8	9
1 Environmental Issues Identification	1								
2 Legal Compliance	.336	1							
3 Environmental Process Management	.208	.212	1						
4 Emergency Preparedness	.396	.396	.296	1					
5 Measurement	.093	.180	.286	.319	1				
6 Monitoring	.343	.580	.394	.548	.354	1			
7 Control	.284	.358	.348	.521	.351	.519	1		
8 Continual Improvement	.219	.316	.329	.340	.275	.432	.478	1	
9 Supplier Management	.185	.290	.111	.347	.349	.480	.353	.499	1

The result of the correlation analysis between the different environmental management constructs indicated that the coefficients of Pearson correlation between the environmental constructs were found to be positive and greater than zero. Thus, the selected Environmental Management constructs have positive correlation between them. The results also indicated the presence of moderately high coefficients of correlation in most of the cases. This represented the absence of very high positive correlation between the Environmental Management constructs. The moderately positive correlation between the different environmental management constructs ensured the presence of discriminant validity in the used scale of EMS management. In the study, the CR statistic, AVE, MSV indicators of all the included environmental management constructs was estimated. The results are shown below in the table 4.3:

Table 4.3: Validity indicates of the measurement model

	CR	AVE	MSV
Environmental issues Identification	0.838	0.512	0.119
Legal Compliance	0.835	0.563	0.329
Environmental Process Management	0.939	0.528	0.143
Emergency Preparedness	0.797	0.505	0.254
Measurement	0.842	0.521	0.080
Monitoring	0.876	0.544	0.329
Control	0.863	0.677	0.252
Continual Improvement	0.905	0.546	0.215
Supplier Management	0.867	0.527	0.208

The results of the CFA analysis of the measurement model as represented by CFA diagram indicate that the CR indicator of the EMS factors were found to be greater than 0.7 and AVE indicators were greater than 0.5. Hence, the convergent validity of the included constructs of EMS implementation was ensured. In addition to this AVE was found to be greater than MSV ensuring the existence of discriminant validity among the EMS factors included in the study. The statistical fitness of the EMS model was also estimated in the study.

Table 4.4: Statistical Fitness Index of measurement model of EMS

CMIN/DF	RMR	CFI	RMSEA
1.723	.047	.90	.059

The results indicates that the measurement model is statistically fit and further statistical analysis can be done in the study.

The Second Order Confirmatory Factor Analysis of Organizational Performance

As Organizational performance is described by Environmental Performance, Operating Performance, Financial Performance and Overall Business Performance it is said to be a second order construct. So second order CFA is employed by the researcher to confirm that organizational performance construct which is the main construct consists of four underlying subconstructs and each subconstruct is further measured by using a number of items in the questionnaire.

Table 4.5: Regression weights of second order confirmatory Factor Analysis of Organizational Performance

Items		Construct Name	Unstandardized Estimate	Standardised Estimates	Standard Errors	Critical Ratio	P Value
Air Emissions	J1	Environmental Performance	.896	.745	.090	9.998	***
Solid Waste generation	J2		1.013	.793	.094	10.782	***
E- Waste generation	J3		.994	.758	.098	10.193	***
Waste water emissions containing organic material	J4		1.024	.757	.100	10.204	***
Water consumption	J5		1.036	.822	.092	11.281	***
Energy consumption	J6		1.140	.813	.102	11.129	***
Consumption of natural resources	J7		1.100	.799	.101	10.893	***
Raw material use	J8		.974	.761	.095	10.264	***
Soil Contamination	J9		1.078	.810	.097	11.082	***
Environmental risk and	J10		1.000	.773			

incidents							
Waste reduction through product/service redesign	K1	Operating Performance	1.181	.755	.128	9.212	***
Waste reduction through process redesign	K2		1.016	.714	.117	8.700	***
Cycle time	K3		1.015	.700	.119	8.544	***
Overall Productivity	K4		1.114	.761	.120	9.293	***
Improvement in the product as a result of process change	K5		1.231	.771	.131	9.403	***
Product innovation	K6		1.333	.786	.139	9.587	***
Efficiency of processes	K7		1.088	.748	.119	9.127	***
Operational control	K8		1.142	.754	.124	9.204	***
Operational cost	K9		1.123	.751	.123	9.162	***
Recycling Activities	K10		.915	.715	.105	8.730	***
Use of recycled material	K11		1.066	.715	.110	9.709	***
Improvement in working environment.	K12		1.000	.713			
Corporate image	L1	Overall business Performance	1.034	.748	.107	9.698	***
Commitment to improve	L2		.970	.681	.111	8.726	***
Discipline and Order	L3		1.032	.722	.111	9.322	***
Management control	L4		.879	.672	.102	8.611	***
Environmental Awareness/Accountability at all levels	L5		1.061	.768	.106	9.993	***
Better documentation	L6		1.119	.819	.104	10.749	***
Regulatory compliance and legal certainty	L7		.917	.733	.097	9.485	***
Cooperation with authorities	L8		1.035	.775	.102	10.098	***
Rejects	L9		1.028	.737	.108	9.531	***
Legal fines	L10		.962	.723	.103	9.327	***
Plant safety	L11		1.041	.795	.100	10.389	***
Chances of successfully selling its products in international markets	L12		.984	.721	.106	9.309	***
Employee morale	L13		1.000	.749			
Cost saving from waste reduction or disposal	M1	Financial Performance	.897	.778	.077	11.644	***

Return on investment	M2		.853	.779	.073	11.668	***
Competitive advantage on differentiation	M3		.990	.831	.077	12.883	***
Sales growth	M4		.908	.763	.080	11.297	***
Market Share	M5		1.003	.827	.078	12.779	***
Company's profit	M6		1.063	.883	.075	14.234	***
Company's wealth	M7		1.000	.838			

It has been observed that all fitness indexes have achieved the level required so no item deletion is required. The results showed that organizational Performance loads well on its four sub- constructs. The factor loading of organizational Performance on Environmental performance, Operating Performance, Overall business performance and financial performance are 0.623, 0.553, 0.570 & 0.376 respectively. Furthermore, the R² for all sub-constructs are (0.39, 0.31, 0.32, 0.14) which reflect the contribution of four sub-constructs on Organizational performance.

To examine the significance of the main construct on every sub-construct in the model the output of Regression Path Coefficient is shown below in Table 4.5.

Table 4.5: The regression path coefficient and its significance

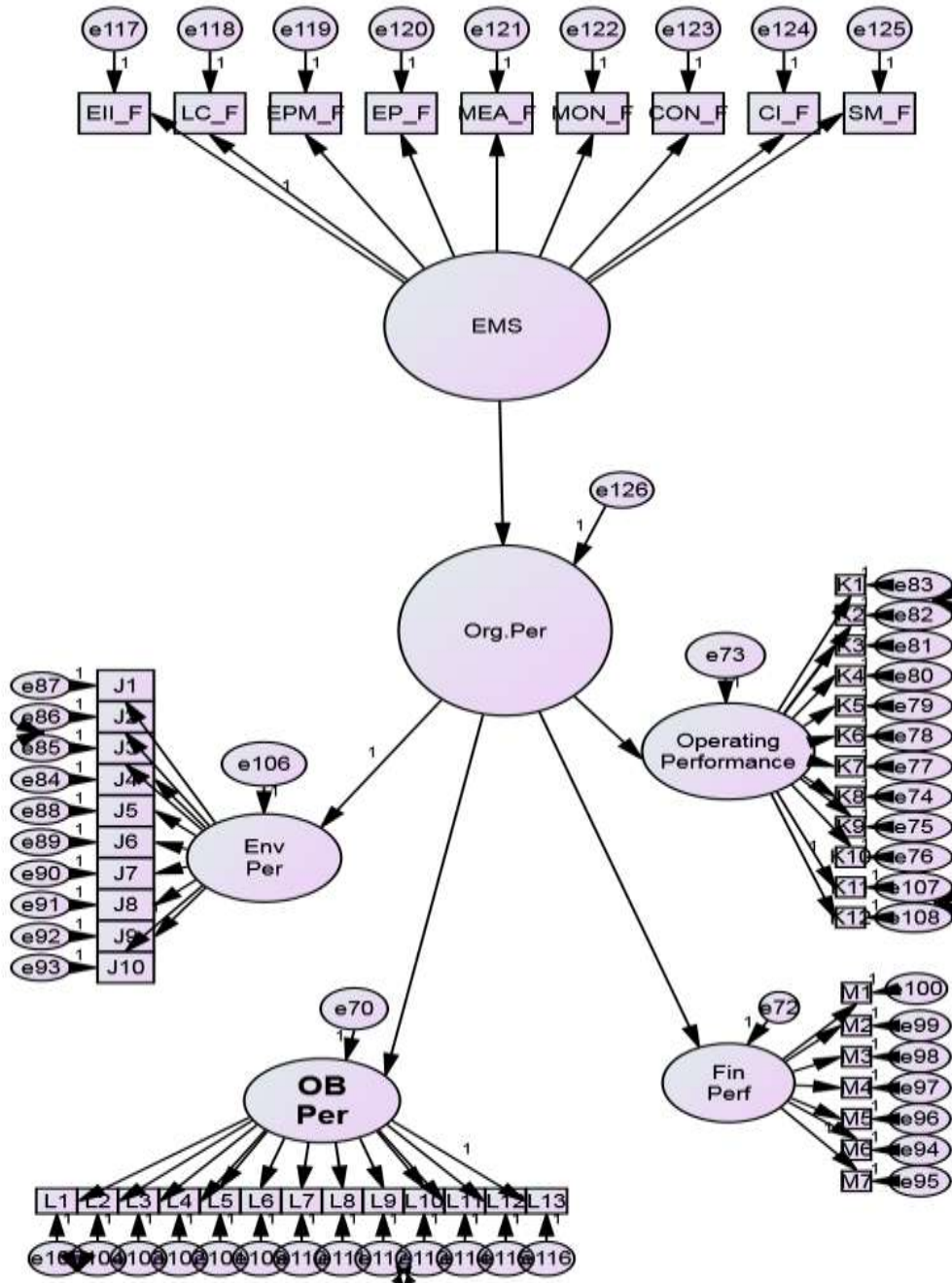
			Estimate	S.E.	C.R.	P	R ²	Results
Environmental Performance	□	Organizational Performance	1.373	.392	3.500	***	0.39	Significant
Operating Performance	□	Organizational Performance	1.000	Reference point			0.31	Significant
Overall Business Performance	□	Organizational Performance	1.148	.329	3.486	***	0.32	Significant
Financial performance	□	Organizational Performance	.898	.309	2.908	.004	0.14	Significant

Table 4.6: Statistical Fitness index of CFA of Organizational Performance

CMIN/DF	RMR	IFI	TLI	CFI	RMSEA
1.544	.051	.908	.901	.907	.059

The results indicates that the measurement model is statistically fit and further statistical analysis can be done through Structure Equation Modelling. The hypothesized structural model of Environmental Management system and Organizational Performance is shown in Fig. 4.1.

Figure 4.1: Hypothesized Structural Model of Environmental Management System and Organizational performance



The results of SEM approach are shown below in table 4.7

Table 4.7: SEM results of Environmental Management System and Organizational Performance

Endogenous Construct		Exogenous Construct	Unstandardized Regression coefficient	Standardized Regression coefficient	Standard Error (S.E.)	Critical Ratio (C.R.)	P Value	R Square
Organizational Performance	<---	Environmental Management system	.310	.670	.097	3.207	.001	.449

Table 4.8: Statistical Fitness Index of SEM model of Environmental Management System and Organizational Performance.

CMIN/DF	GFI	AGFI	CFI	RMSEA
1.487	.710	.684	.90	0.055

The model indices of the SEM model as shown in table 4.8 indicates that the model is statistically fit and can be generalized for further use.

5. Discussion and Conclusion

This study contributes to the environmental management literature in several ways. Firstly, it developed a scale measuring the Environmental Management factors and factors of Organizational Performance through confirmatory factor analysis. Secondly a step further to CFA, structural equation modeling was applied to test the proposed relationship between factors of Environmental Management System and Organizational Performance.

The results of the SEM analysis indicate that the p values of the critical ratio in case of all the assumed inter-relationship are found to be less than 5 percent level of significance. Thus, the proposed hypothesis could be accepted. The model accounted for 45% of the variance in Organizational Performance. The results are supported by a number of studies that has tested the relationship between environmental management and firm performance and has found a positive relationship (King and Lenox, 2002; Melnyk et al., 2003; Claver et al. (2007); Nishitani et al. (2012); Green et al. (2012); Lun (2011); Vries et al. (2012); Cheng (2013); López-Gamero et al. (2009).

Thus, the Hypothesis,

There would be significant positive impact of factors of Environmental Management System on Organizational Performance in ISO certified companies is supported.

This study has evaluated the impact of EMS on self-reported measures of organizational performance and suggests that if Indian companies focus more and more on their Environmental Management system, they would definitely enhance business efficiencies and gain competitive advantage.

6. Managerial implications

This research provides important guidelines to policy makers and decision makers for implementing a successful Environmental Management system in the organizations which could help the companies to improve Organizational Performance. It can help the companies in creating an organization culture where major priority could be given to environmental aspects. They can motivate employees to be more involved in environmental concerns and develop proactive strategies which could bring real benefits to the company.

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