ABSTRACT

1.1 Present Economic and Environmental Scenario in India

Indian Economy has been growing at fast pace resulting in rapid increase of industries in all major sectors. This growth is essential for raising the living standards of people. Due to increase in industries and the economic power of the people, the demand for power, infrastructure, goods and services is also increasing at fast rates necessitating expanding the existing facilities as well as installing many new ones.

The rapid proliferation of industries resulted in air and water pollution leading to environmental damage and health hazards apart from depleting scarce natural resources. More than 99.5% of Indian population breathes unhealthy air reducing life expectancy by 3 years apart from loss of millions of man hours due to health problems. Water from most of the rivers has become undrinkable. Ground water tables have been going down and surface water has become contaminated in the vicinity of industries. The natural resources like coal and oil will get exhausted by 2050 making India dependent on foreign countries for its energy needs.

These problems are likely to increase further as more and more industries will be come into operation due to the increased demands. Therefore, there is a need to maintain proper balance between economic growth and environmental protection as has been done in most of the developed countries. The developed countries took green initiatives as early as 1996 and most of them obtained ISO-14001 certification as the first step towards environmental protection. Subsequently, not only there was increase in the number of these companies but also these companies adopted higher levels of green initiatives by investing in many environmental management systems. Many of these companies have even generated financial profits through investments in green initiatives.

1.2 Need for Specific Research in India

On the other hand, the scenario in India has been totally different. Till 2001, hardly any effort was made towards environmental protection. Only 0.3% of the total industries in India have obtained ISO-14001 certification till now as compared to
China and Japan which these percentages are around 20-25%. The implementation of environmental laws in India is ineffective and the financial strength of most of the companies is either moderate or weak due to which companies have been hesitating to invest in green initiatives. Most importantly, there is not enough research to support that investments in green initiatives can be financially beneficial for companies in India also. Most of the research work done in India had been concentrating on specific areas and does not cover major sectors in totality. Also, the available researches have not brought out the factors which are responsible for the low adoption of green initiatives in India. Eight sectors comprising of automobile, oil & petroleum, Chemical & Textiles, power, cement, electronics, manufacturing and services have been designated as the most polluting sectors in India. They are also the sectors which contain more than 90% of the ISO-14001 certified companies registered in India. Therefore, there is an urgent need to conduct comprehensive research to find out the reasons for the low adoption of green initiatives taken by these companies in India and to suggest remedial measures. As adoption of green initiatives is linked with the financial strengths of the companies, it is necessary to study the effect of financial implications on the green initiatives taken by ISO-14001 certified companies in India.

1.3 Factors Influencing Adoption of Green Initiatives

Companies adopt green initiatives either due to normative, coercive or mimetic pressures or because of expectations of economic and environmental benefits. Companies located in different parts of the world experience different levels of pressures and benefits depending upon their nature of operation. Hence, their levels of adoption of green initiatives will depend upon their country as well as their nature of operations. Also as adoption of green initiatives require investments in terms of plants, technology, R&D, change in procedures as well in training of employees and dealers; companies would not invest in green initiatives unless these pressures are high or the company is convinced of obtaining financial savings. In the developed world, lots of studies have been carried out to prove that investments in green initiatives can be profit generating through resource and energy conservation. Convinced of these facts, companies have invested substantially in R&D, product and process development and waste treatment reaping financial benefits apart from fulfilling their obligations towards environmental management.
1.4 Identification of Green Initiatives

From the above study reports, the important initiatives being adopted in general by majority of the companies in different parts of the world have been identified as follows:

i) Reduction in usage of raw material  
ii) Reduction in the emission of toxic gasses  
iii) Reduction in solid/liquid waste  
iv) Optimization of production processes  
v) Installation of waste treatment plants  
vi) Modification of existing plants for waste reduction  
vii) R&D for new product development  
viii) Substitution of hazardous substances (SoHS)  
ix) Repair, reuse and recycling of materials  
x) Reduction in air, water and energy consumption  
xi) Supplying waste to others as input  
xii) Use of alternate/renewable sources of energy  
xiii) Locating suppliers closer to production facilities  
xiv) Green transportation using rail and sea mode  
xv) Incentives to customers to return products after end of life cycle  
xvi) Restoration of damage caused to land and water  
xvii) Incorporating changes in policies and procedures  
xviii) Training of employees  
xix) Training of suppliers and dealers  
xx) Increased maintenance on new equipment  
xxi) Hiring of ISO consultants

1.5 Financial Implications of Green Initiatives

The relation between adoption of green initiatives and its financial implications can thus be defined by the following equation:

\[ AGI = \sum \text{effects of (Pressures + Benefits + Investments + Savings)} \]  \[ FI = \sum \text{Investments} - \sum (\text{Benefits + Savings}) \]
AGI is adoption of green initiatives and FI is financial implications

**Fig 1.1 Financial Implications of Green Initiatives**

1.6 Three Levels of Green Initiatives

Researches in the developed world have brought out three distinct levels of green initiatives. Companies which take green initiatives only to comply with the laid down environment laws are called reactive and fall into the lowest level. Companies which take initiatives in anticipation of the changing environmental conditions adopt higher level of initiatives called pro-active and fall in the second highest level. Companies which take initiatives to reduce wastages at every stage of the supply chain invest substantially in green initiatives but also save finances through reduction in wastages. Such companies are termed value-seeking and fall in the highest level.

1.7 Identification of Gaps

From the above researches carried out in India, following gaps were identified:

i) No comprehensive research indicating the levels of pressures being experienced by companies in different industrial sectors as a whole were available. Most of the studies have been limited to one or two sectors only. Areas where pressures were low and needed increase were not known.

ii) No research was available to indicate the levels of various benefits being extracted by different companies. Areas where these benefits were low and needed improvement were not known.
iii) The studies carried out on the levels of investments made by companies with commensurate benefits and savings achieved have been unrelated with many companies indicating just investments and savings in certain limited areas only. There was no study to indicate the areas where companies in different industrial sectors had made high investments and needed reduction to increase adoption of green initiatives.

iv) No research was available on the savings obtained by companies in different industrial sectors as a result of green initiatives. Areas where savings were low and required increase had not been identified.

v) No research had been conducted in India to establish the relation between the levels of green initiatives and their financial implications for major industrial sectors as a whole.

1.8 Research Objectives

From the identified gaps, following research objectives were finalized:

Objective No 1. To assess the strength of various factors (pressures, benefits, investments and savings) experienced by companies in India due to adoption of green initiatives considering i) All industrial sectors as one data ii) Treating industrial sectors separately.

Objective No 2. To identify green initiatives which resulted in financial implications to the companies (through validation of various null hypotheses).

Objective No 3. To find out the level of green initiatives taken by ISO-14001 certified companies in India and to establish relationship between the level of green initiatives taken by companies and their financial implications.

Objective No 4. To recommend measures for improving the level of green initiative by these companies preferably maintaining the existing level of financial implications.

Objective No 5

i) To identify factors which exerted low pressures on the companies for adopting green initiatives and to recommend measures for their improvements.

ii) To identify factors which resulted in low benefits to the companies and to recommend measures for their increase.
iii) To identify areas where companies had to make high investments for adoption of green initiatives and to suggest measures for decreasing these investments.

iv) To identify areas which resulted in low savings to the companies and to recommend measures for their increase.

1.9 Formulation of Research Hypotheses

To find out the factors which had impact on the financial implications, 18 null hypotheses were formed in four sections. The details of hypotheses with their results are discussed later in this abstract.

1.10 Development of Conceptual Model

![Fig 1.2 Conceptual Model](image-url)
1.11 Data Collection and Validation

To obtain data on various parameters, use of a structured questionnaire based survey was made with data obtained on five point Likert scale. The questionnaires were mailed to 658 ISO-14001 certified companies in eight selected industrial sectors throughout the country. A total of 186 responses were received from 658 questionnaires. Fourteen questionnaires were discarded due to incomplete data and only 172 responses were used for the analysis. This indicated a response rate of 26.13%. The sample size of 172 at 95% confidence level gave a margin of error of 7.2% which was considered adequate. The validity check to ascertain the accuracy and reliability of the questionnaire was done through cronbach alpha which were calculated using IBM SPSS version 21. The values of cronbach alpha for the variables were found to lie between 0.72 and 0.76 which met the Nunnally’s (1978) criterion for internal reliability.

1.12 Result Analysis

For conducting the exploratory part of the data analysis, Microsoft EXCEL program was found suitable as it was convenient to plot the data in the form of bar charts. For confirmatory analysis linear multiple regression analysis was. Testing of various null hypotheses was done on the basis of the calculated values of ‘significance’ at a confidence level of 95%. A null hypothesis was rejected in case of significance values less than 0.05.

1.13 Objective No 1: Assessing Strength of Pressures, Benefits, Investments and Savings

The assessment of the strength of pressures was carried out through 10 different indicators while benefits had 11 indicators. The strength of investments and savings were assessed through 16 and 21 indicators respectively. The strength of these factors as computed through the data analysis is shown below through bar charts. The red bars show those indicators where null hypotheses have been accepted indicating the positive impact of these factors on company’s financial implications.
Fig 1.3 Strength of Various Factors Indicating Pressures on the companies
(Values along Y-Axis in % for all Factors)

![Bar chart showing strength of various factors indicating pressures on companies]

Figure 1.4 Strength of Various Factors Indicating Benefits Obtained by the Companies

![Bar chart showing strength of various factors indicating benefits obtained by companies]

Null Hypothesis Accepted

Indicators of Benefits
Fig 1.5 Strength of Various Factors Indicating Investments Made by Companies

Indicators of Investments

Null hypothesis Accepted

Fig 1.6: Strength of Various Factors Indicating Savings Obtained by Companies

Indicators of Savings

Null hypothesis Accepted
1.14: Result of Hypotheses Testing

The results obtained through the testing of various null hypotheses brought out the factors which were having positive relations with the financial implications on the firms for the Indian environment. Companies in India should accord first priority to these factors and can then address other factors depending upon the finances available to them.

1.15 Objective No 3. Determining the Level of Green Initiatives Adopted by Indian Companies

Out of 10 factors constituting pressures, the strength of only three factors were high, one was moderate and rest six factors exerted very low pressures on the management. From this it was concluded that sum of all pressures experienced by 172 companies in India was low. Out of eleven factors responsible for extracting benefits, the strengths of four factors were high, moderate for five and low for two factors. From this it was concluded that in totality for 172 companies, the sum of the strengths of all the benefits obtained was moderate. Out of 16 parameters representing investments 8 were high, 6 moderate and 2 were low bringing out the fact that the investments
made by companies in India on the adoption of green initiatives were high. Majority of companies in India have low to moderate financial strengths and committing even moderate investments might be very difficult for some of them. Out of 21 factors constituting savings, the strength of only 5 were high, moderate for 9 and low for 7. This led to the conclusion that sum of all savings obtained by companies in India was low.

1.16 Financial Implications of Reactive Level of Green Initiatives Adopted by Indian Companies

From the above analysis, the financial implications to the companies can be summed up by the following relation

\[
\text{Financial Implications} \propto \left\{ \sum \text{Investments} - \left( \sum \text{Benefits} + \sum \text{Savings} \right) \right\}
\]

As explained above, as investments made by companies were high, benefits were moderate and savings were low, it can be inferred that the financial implications to the companies for adopting the reactive level of green initiatives were high. These findings establish the fact that ISO-14001 certified companies in India adopted the lowest level of green initiatives. This was due to the fact that financial implications to the companies even to adopt this level of green initiatives were very high.. Determining the relationship between the level of green initiative and their financial implications fulfils the requirements of second part of third research objective.

1.17 Objective No 4. Increasing level of green initiatives with existing financial implications

The level of green initiatives adopted by companies was found to be the lowest due to their higher financial implications. Companies invested in initiatives only to adhere to the laid down environmental laws or in measures which had proved to be cost effective in long run. As these initiatives had high initial costs, companies could extract only low benefits and savings forcing them to restrict their initiatives. However, the results of this research have brought out many areas where companies could extract high benefits as well as savings through low investments as explained below:
i) Majority of the companies could not extract benefits due to premium price, increased market share, entry to new markets and increased grants due to their green image indicating low awareness among the customers regarding the green initiatives taken by companies. Companies need to increase this awareness by increasing advertisements to increase these benefits.

ii) Companies extracted low savings in their efforts to reduce production costs, reduction in raw material, supplying waste to other companies, extraction of energy of hot gasses before emission, locating suppliers closer to plants, using green transportation etc. Companies need to increase these savings through investments in optimization of plants and processes, by carrying out R&D to develop new and cheaper products.

iii) Companies had to invest high finances in the training of their employees as well as for hiring of ISO-consultants. Companies generally have well established training departments which should undertake these tasks at low costs.

Apart from these above mentioned points, the result analysis of various industrial sectors have brought out the specific areas where companies had to make high investments but could obtain only low benefits and savings. Companies can make use of these results to invest in those activities which would bring higher benefits and savings to them at least costs. These measures would reduce the financial implications of the companies motivating them to increase their levels of adoption of green initiative to pro-active and value seeking. This analysis meets the requirements of fourth objective of our research.

1.18 Contribution of this Research

i) This research has established that level of green initiative taken by companies in India is at the lowest level called reactive. Companies have taken initiatives only to the extent to comply with the laid down environment laws.

ii) The levels of initiatives are low because of high financial implications due to high investments made by companies along with accrual of low savings and benefits.
iii) It has been established that Indian companies can also accrue benefits and savings by investments in green initiatives as has been achieved by companies in the developed countries.

iv) Various factors which resulted in low benefits to the companies and need to be strengthened to motivate them to adopt higher level of green initiatives have been identified.

v) The areas where companies accrued low savings have also been identified along with the measures for their improvements.

vi) Areas where companies had to make higher levels of investments have also been identified along with measures required to be taken for reducing them.

vii) Companies in the eight industrial sectors have been given data on all the inputs required by them to plan their strategies to extract high benefits and savings by adopting green initiatives

viii) Companies in different industrial sectors would now be in a position to obtain higher levels of benefits and savings by adopting suitable levels of green initiatives in accordance with their financial resources.

ix) The apprehensions in the mind of the industry that adoption of green initiatives is financially expensive can now be dispelled.

x) The industry had invested moderately in only selected areas with the sole aim of adhering to the laid down environmental laws. Now they can invest in those areas also where green initiatives bring higher benefits and savings at lower financial costs.

xi) This research could motivate the remaining 99.7% of the industries in India also to adopt green initiatives

1.19 Objective No 5: Recommendations for Increasing Pressures, Benefits, Savings and for Reducing Investments

The strength of indicators of pressures, benefits, investments and savings on the Indian companies have been shown in Fig1.3 o Fig 1.7 above. Pressures which were from the share holders, customers, employees, local community, NGOs and from successful competitors. Increase of these pressures would force companies to adopt
higher levels of green initiatives. Factors which brought low benefits to the companies were profit margins, market share and entry to new markets, production costs and reduction in visits from environmental agencies. By increasing these benefits, companies’ motivation to adopt higher levels of green initiatives could be increased.

The areas where companies had to make high investments and required reduction were optimization of production processes, repair/reuse/recycling, installation of waste treatment plants, reduction in air water and energy consumption, installation of alternate sources of energy, land and water restoration, employee training, hiring of ISO consultants and reduction in emission of toxic gasses. The areas where companies could not obtain high savings were found to be reduction in raw material, R & D of new products, extraction of energy of gases before emission, suppliers location, green transportation, land water restoration, supply of waste to other industries, premium price, increased market share, entry to new markets, grants from agencies, reduced penalties, trading carbon credits, employee and supplier training. Companies need to adopt proper methods applicable to their environment for increasing savings in these areas.

The areas where companies were able to extract high savings were reduction in air water and energy consumption, optimization of processes, installation of alternate sources of energy, substitution of hazardous materials, changes in policies and procedures and brand image due to CSR. This gives a readymade list for companies which have not adopted green initiatives to become environmental conscious by adopting green initiatives starting from these areas. This would give them the advantages which green companies have been able to achieve.

1.20 Limitations of the Existing Research

Following had been the limitations of the present research:

i) The research had been conducted on 172 samples constituting a sample size of only 7%. Lower data samples could introduce certain errors in the results.

ii) The analysis on 172 companies taken together has been comprehensive. The effects of all the 70 parameters constituting pressures, benefits, investments and savings have been calculated as bar charts. However, companies in different industrial sectors would face different levels of pressures, benefits, investments and savings.
Consequently, their level of adoption of green initiatives and its financial implications would be different for each of the eight industrial sectors. The financial implication of green initiatives taken by individual sector was found beyond the scope of this research and has been left for future researches.

iii) The analysis of data among the eight sectors were carried out with each sector containing 25-30 samples which constituted low sample size and could introduce certain errors.

iv) The analysis has been carried out using questionnaire where in many cases the information given by respondents were with little apprehensions which could introduce certain bias in the results.

v) The hypotheses testing had been carried out assuming linear relationship among different variables which may not be true in every case.

vi) The research has been limited to ISO-14001 certified companies in India which constitute less than 1% of the total number of companies. There is an urgent need to extend this research to non ISO-14001 companies also.

1.21. Future Scope

i) The future research could concentrate on finding out the adoption levels of green initiatives taken by the above eight industrial sectors on a larger data base.

ii) The future research could find out the green initiatives taken by non-ISO-14001 certified companies also and suggest measures to motivate them to adopt at least the reactive level of green initiatives.

iii) The future researches could base their analysis on larger number of samples in different industrial sectors.

iv) Testing of various hypotheses could be done after finding the exact relationship among different variables.

1.22 Conclusion

This research has established the fact that companies in India have not been adopting green initiatives thereby facing penalties and risks to their business due to
environmental violations. These companies have also not obtained various benefits offered by adoption of green initiatives. The research has highlighted that level of green initiatives adopted by a company depends upon the resultant of pressures, benefits, investment capability as well as savings obtained by the company due to these initiatives. This research has assessed the strength of pressures, benefits, investments and savings on 172 companies in India considering them i) as one sample and ii) As individual industrial sectors.

It was proved that financial implications to the ISO-14001 certified companies in India have been high due to low pressures experienced by the firms, moderate benefits, high investments as well as low savings. Consequently, even ISO -14001 certified companies in India had adopted the lowest level of green initiatives. The research has also identified the measures for increasing the level of green initiatives by companies in India with their existing financial resources by increasing benefits and savings. Using null hypotheses testing, among the 58 indicators considered, indicators having impact on financial implications on the companies in Indian scenario have also been identified to enable companies to accord higher priority to these initiatives.

This research has proved that companies in India can also obtain savings through the adoption of green initiatives, a fact which motivated large number of companies in the developed countries to invest in green initiatives. The research has also recommended the measures through which strength of pressures, benefits and savings could be increased and investments decreased to reduce the financial implications to the Indian companies so as to motivate the ISO-14001 certified companies to raise their level from reactive to pro-active and value seeking and other non ISO-14001 certified companies to adopt green initiatives by obtaining ISO-14001 certification as first step. A readymade list has also been made available to companies in eight industrial sectors through which they can obtain benefits through adoption of green initiatives.