<table>
<thead>
<tr>
<th>Chapter 8: Key Findings, Implications and Future Directions</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.1. Key Findings</td>
</tr>
<tr>
<td>8.2. Implications of the Research</td>
</tr>
<tr>
<td>8.3. Direction for Future Research</td>
</tr>
<tr>
<td>8.4 Conclusion</td>
</tr>
</tbody>
</table>
Chapter 8
Key Findings, Implications and Future Directions

8.1. Key Findings

- Waste disposal, air emission, low level of eco-literacy and depleting natural resources are the major environmental concerns of the Indian manufacturing industry.

- Lack of commitment from the top management, inadequate adoption of reverse logistic practices, low level of eco-literacy among supply chain partners, lack of corporate social responsibility, and lack of market demand for green products emerged as the prominent barriers for the impacting integration of environmental concerns in business processes.

- Reverse logistics practices are not being widely adopted in Indian manufacturing organizations.

- Responding companies have implemented ISO: 9000 quality management system. However, only 50% of them had implemented ISO: 14001 EMS.

- Greening of suppliers is not a very common practice in Indian manufacturing sector.

- Modern environmental management techniques and practices such as benchmarking, carbon trading, eco-labeling, Life Cycle Assessment (LCA), balanced scorecard for performance management, public environmental reporting, environmental accounting, product recovery after end-of-life, are hardly being practiced in organizations surveyed.

- Environmental responsiveness related parameters are rarely used in performance reviews of employees.

- Organizations are more inclined to pursue pollution control than pollution prevention approach. Environmental policy beyond legislative compliance is moderately adopted in Indian industry.

- Environmental performance measurement is not extensively practiced in the Indian manufacturing organizations.
Use of recycled paper is found to be low in the Indian manufacturing industry.

Pollution prevention, improved working environment, increased employees environmental awareness, better corporate image, and exploring international markets were the five most cited benefits of integrating concerns in business processes.

Top management commitment, societal concern for protection of natural environment, government policies & regulations, eco-literacy of the supply chain partners, and customer's demand for environmental improvement emerged as five key enablers influencing integration of environmental concerns in business processes.

Results of the ISM-based model suggest that four barriers namely lack of corporate social responsibility, lack of commitment from the top management, inadequate strategic planning and lack of support & guidance from regulatory authorities have strong driving power and low dependence on other barriers. Thus, these barriers, by virtue of their strong driving power, create remaining barriers as well, such as lack of appropriate environmental performance matrices, lack of preparedness on the part of suppliers, lack of eco-literacy among the supply chain partners, resistance to change and adopt innovations, lack of integrated information system, etc.

ISM-based model also suggests that enablers such as government policies and regulations, societal concern for protection of natural environment, eco-literacy among supply chain partners, top management commitment, lean manufacturing, ISO 14001 certification and proper workplace management & housekeeping form the base. So, organizations need to focus ensuring presence of these enablers.

ISM-based model also indicates that enhanced customer satisfaction through better environmental performance can be achieved by continuously improving the enablers possessing higher driving power. Most of these enablers have strategic orientation.
Chapter 8  

Key Findings, Implications and Future Directions

- Continuous improvement of organization's environmental performance is positively influenced by: (i) assignment of roles and responsibilities with respect to environmental programs (ii) setting of quantifiable environmental objectives, and (iii) benchmarking environmental performance.

- Implementation of proactive environmental policy beyond compliance to legislative requirements is facilitated by: (i) environmental accounting (ii) balanced scorecard for environmental performance measurement, and (iii) environmental criteria in the performance review of employees.

- Market demand for green products is negatively influenced by (i) lack of support and guidance from regulatory authorities, (ii) lack of eco-literacy amongst the supply chain partners, and (iii) inadequate adoption of reverse logistics practices.

- Large enterprises pay greater attention to regular monitoring of environmental performance indicators than SMEs.

- Electrical & electronics sector pays more attention to products designed for energy efficiency in comparison to automobile sector.

- All the industrial sectors accord similar importance to certification to ISO 14001 EMS as enabler facilitating integration of environmental concerns in business processes.

- Eco-literacy among the supply chain partners leads to development of green products.

- Green product development leads to eco-labeling of products.

- Eco-labeling of products creates a better corporate image.

- Pollution prevention leads to reduction in consumption of resources.

- Reduced consumption of resources helps in improving productivity.

- Increased productivity leads in improvement in returns on investment.

- Results of the SEM-based model suggest that greening of production and TQEM practices help in resource conservation and pollution prevention.

- SEM analysis also suggests that adoption of green business practices such as greening of suppliers, TQEM and greening of production lead to
improvement in competitiveness and economic performance of the organization.

8.2. Implications of the Research
This research has contributed to the growing literature on greening business and its practices. The findings shed light on implementation issues in GSCM such as green product development, green procurement, green manufacturing and reverse logistics. The analysis reveals that by laying proper emphasis on integration of environmental concerns in the key business processes (such as product design, procurement, manufacturing, and reverse logistics) improvement in the environmental performance of the entire supply chain is possible.

Specifically, key implications of this research for practitioners are as follows:

- The present state of green business practices has been explored in this research in the context of Indian manufacturing industry. This information may act as an input in design and development of green supply chain management programs in organizations, in general and manufacturing sector, in particular.

- Managers from operations, environmental health & safety (EHS) and supply chain management areas may gain insights from this empirical study. It is observed from the research that adoption of lean manufacturing practices, ISO: 14001 certification, implementation of proper housekeeping practices (such as 5S), enhancing eco-literacy of the supply chain partners, green purchasing, adoption of reverse logistics practices in the supply chain may be given top priority for improving the environmental performance of the organisations.

- Lack of corporate social responsibility and lack of commitment from top management have emerged as key barriers in adoption and implementation of green supply chain management practices and programs. Therefore, the top management of companies needs to make efforts to address these barriers.

- Integrating environmental concerns in business processes results into many benefits like pollution prevention, improved working environment,
enhanced employees' environmental awareness, better corporate image, better exploration of international markets, reduced risks of litigations, etc. Therefore, managers can adopt green supply chain management practices in their organization in order to harvest related benefits.

- Suppliers, being an essential part of the supply chain, have very important role to play in green supply chain management programs. It is observed from the survey that organizations are taking limited initiatives to ensure and enhance the environmental performance of their suppliers. Managers need to make efforts to ensure the active participation of their suppliers in the design and implementation of green business practices.

- Actions are called for to enhance the effectiveness of the enablers facilitating integration of environmental concerns in business processes. Simultaneously, there is a need to focus on reducing the impact and growth of the barriers for attaining success in green supply chain management programs.

- Design for the Environment and Life Cycle Assessment are critical for GSCM programs. Managers may adopt these techniques for ensuring environmental-friendly product designs and also capturing data related the environmental impact created by the product throughout its entire life.

- It is observed from the survey that green purchasing by government can give a significant fillip to GSCM programs. Possibilities in this area may be explored.

- It is observed that implementation of EMS such as ISO: 14001 is one of the significant enablers that help GSCM programs. Managers should make necessary efforts to adopt and implement EMS for enhancing the success of GSCM programs.

8.3. Directions for Future Research

- In this study, only three industrial sectors have been targeted, which may not represent the entire Indian manufacturing sector. Studies may be carried out in other industrial sectors. That shall help understand the context of environmental concerns in other sectors as well.
• The survey questionnaire developed in this research is a comprehensive one. It has emerged out of thorough literature survey. The same instrument, after suitable modification, could be used as an instrument for carrying out further empirical studies in green supply chain management.

• Majority of the respondents to the survey represented the top management in the organizations who were holding top ranking positions such as proprietors, chief executive officer, vice-president, general manager, plant manager, etc. These respondents could be in the best position to give opinion on the strategic dimensions impacting green business practices. However, lower levels of managers are more involved in the operational aspects. Therefore, a good insight of operational issues related to GSCM could have been obtained from functional managers. That may be attempted in future research efforts.

• This study has not covered many issues such as, environmental accounting, green consumerism, green marketing, inbound and outbound logistics, storage and distribution, etc which may be relevant to this theme. These issues may be included in future studies.

• In the present research, only fifteen barriers and enablers were considered for developing ISM-based models, which may further be improved by including additional barriers and enablers. The ISM-based models in the study are developed based on the opinions of the industry experts and academicians and, therefore, they have some element of bias. Another limitation of these models is that they have not been statistically validated. Structural Equation Modeling approach may be applied in future to test the validity of these models.

• It is observed that the amount of variation ($R^2$), accounted for all the proposed hypotheses in this research has ranged from 15.0% to 43.5 %. Since all the values of $R^2$ in this research are found to be less than 100%, which indicates that there are still other variables contributing to the variance. Therefore, the possibility of identifying these variables may be explored in future research.
8.4 Conclusion

The integration of environmental concerns in various business processes and corporate practices is emerging as a key challenge in the present era. Concerns such as increasing pollution, depleting natural resources, loss of bio-diversity have created a pressure on corporate sector to adopt an environmental-friendly approach. Therefore, adoption of green business practices is expected to gain even more momentum in future. Companies need to prepare proactively to meet these challenges. In order to do that, companies need to take a holistic perspective, not departmental, when evaluating environmental concerns. Manufacturing organizations will find that management of business processes and efficiencies will be central to their environmental benign-ness. They shall be able to take advantage of the many win-win opportunities that environmentally safe practices offer, provided they are responsive to these issues. Role of technology and management will be critical in the successful development, implementation, and maintenance of green business practices. To this end, manufacturing organizations are required to integrate a number of functions/resources within organizations from environmental perspectives. The development and integration of green supply chain management practices is still relatively a nascent idea among most Indian organizations. Learning and benchmarking how others have introduced these concepts into organizations will help them ensure successful implementation of green business practices. The long-term sustainability of the company will be dependent on the sustainability of the natural environment. Therefore, for the cause of the Mother Nature that supports us, environmental concerns need to be fully integrated in the business processes and green supply chain management activities ought be aggressively promoted and practiced by the companies.