Chapter 7

CONTRIBUTION OF RESEARCH

7.1 Insights Gained Through Survey

The green revolution has begun and it can be predicted that only the green companies will survive in the future. In the west, even employees join any organisation if it is credible and has established itself in greening, sustainability and corporate social responsibility. This is not so in India where salary and size of the company are still the biggest recruitment incentives.

The survey conducted revealed that the knowledge of greening has penetrated the minds of 30% top management executives in India. Only about 67% companies had ISO 14000 in place. About 30-35% of sample Indian companies were only measuring carbon, green sourcing, mapping the major sources of carbon across entire supply chain, doing internal recycling, using environmental packaging, eco-labelling, rating key suppliers’ sustainability initiative or guiding suppliers to establish their own environmental programs. Hardly any of them use software for carbon measurement. Two extremes were seen, one that many SME organisations did not have any Environment division or an Environment Executive. Basically these companies had started improving their processes to make them less bad. On the other hand many big companies had taken several actions in this area and had earned several awards.
7.2 Visual Experience

This was besides what the management disclosed in the surveys. Few companies were so big and had installed big and heavy equipment imported from the west and Europe. In few manufacturing units, there were employees wearing uniforms covered from head to toe. We had to go through special chambers bare feet and only specific numbers could enter those chambers. These were to ensure we were completely clean. Many areas we were not allowed to go into the core area but could view from glass. Heavy usage of control charts and monitoring of all equipment’s was seen. Few companies had installed huge solar energy tapping units.

Small companies were not as clean but had all processes in place. Management was friendly and cooperative, especially small companies who gave us freebees. The extent of Company’s internal recycling processes could not be measured but bill board notifications and recyclable bins suggested that companies were aware and made efforts to do internal recycling.

7.3 Environmental Orientation of Indian Companies

The conclusion was that the environmental orientation of chemical companies is slightly more than manufacturing followed by large gap in IT and then NGOs. This could be because of chemical companies having to adhere to stricter regulations from the government
and penalties also being levied. Same is the case for manufacturing companies who have to comply with the regulations in several cases. There are also more greening opportunities in Manufacturing and Chemical companies as compared to their IT counterpart. The NGOs are very small in comparison to the big companies as such not many processes are applicable.

### 7.4 Academia Opinion

About 15 experts from top management institutes in India were interviewed. Their answers to the question- ‘What are the major environmental or green issues in SCM?’ were Burning of Waste, Cost, inefficient transportation, electricity usage, energy usage, Global disbursement of facilities, Material waste, Misuse of facilities, improper Packaging, Preservation, Purity of product, reduction activities, Scale of Logistic Activities, serial support, Supply Chain design, Sustainability, Technological improvement in manufacturing, Transportation, usage of Polybag, Water/Air Pollution.

Their answers to the question- ‘What are some of the remedies?’ were Better technology, Green education, Social and environmental responsibility and use of ethanol-biofuel.

Their answers to the question- ‘What are some of the Emerging Concepts?’ were Vendor parties, Logistics optimization, Reverse Logistics, Reusable material, Biodegradable material and Carbon credits.
7.5 Hypotheses Testing

We have tested our hypotheses and could prove the hypotheses which strongly indicate that indeed environmental orientation is linked positively to risk aversion, stringent government norms and image.

The possible causes of failure of 1 antecedent and 3 consequential hypotheses could be due to the sample size or maybe there is not any strong link as we thought there would be. Since a number of factors are responsible for the variables measured in a company, it is not possible to keep all those factors constant while measuring the environmental orientation. Only a very deep level research on a large scale doing sensitivity analysis while measuring the optimum balance of variables for maximization of profits can possibly reveal the true position and link.

Variables like employee satisfaction were also asked in person so there is a possibility that true picture could not have been revealed despite the confidentiality promised. Obtaining funding details was very challenging as many companies were hesitant to answer these kinds of questions.

There is also a possibility that Type II error (Beta error) has been made in which the null hypothesis has been accepted when the alternate one is true.
7.6 **SAP-LAP**

SAP-LAP model is a very effective tool to analyze the case studies and to help in gaining insight into the various perspectives and efforts required in greening the supply chain by various actors of supply chain, and different processes, which enhance the environmental orientation.

In the two case studies, the environmental orientation of supply chain of the two companies with extreme situations was compared. Company A, an SME belonging to PFMG has environmental orientation of about 7% while company B, a large company belonging to Petro-chemical industry has about 83%. Based on these learning issues, corrective actions were recommended to improve the environmental orientation of supply chain.

**Company A**

Company A has not taken any initiatives so it has a lot of potential for greening. Creation of energy saving units and green packaging and labeling are a must.

**Company B**

Company B has already taken several measures. However, my recommendation is to implement enhanced quality training, educational, employment and networking services for the under-represented dealers, and a successful implementation of a web based Business-to-Business exchange system, mutually beneficial to many stakeholders.
7.7 Managerial Recommendations

In conclusion to this thesis, the following immediate and feasible managerial recommendations are being suggested:

Environmental orientation should be embedded in the strategy of organisations so as to incorporate it in every process. The top management should be trained in the latest know-how of energy saving measures. They should imbibe cradle to cradle philosophy for all the material resources used. The Cradle to Cradle concept was developed by W. McDonough and M. Braungart. The Cradle to Cradle approach starts with intelligent design, covers supply chains (the recycling of natural resources via product and manufacturing design, to high value reuse) and also involves systems (key supplies, ecosystems, space and energy) as well as management (via money, rules, spatial planning). It is a concept that contributes to a reduction of the use of raw materials, generates less environmental pollution, contributes to our economic growth and allows us to make better use of scarce space.

Renewable energy should be utilized for saving energy and cutting cost. Greening of buildings can be done by having energy saving and efficient air conditioning and heating systems. Renewable energy technologies are clean sources of energy that have a much lower environmental impact than conventional energy technologies. The different types of renewable energy are:

- Solar Energy
- Geothermal Energy
- Wind Energy
- Bioenergy
Proper budget should be allocated for greening. Green products should only be purchased by the Purchasing Department. Green goals should be incorporated into incentives. All the employees of an organisation should be made aware of the importance of environmental efforts. They should be educated and trained for environmental orientation. Eco friendly behaviour should be rewarded. The office can encourage automation instead of paper usage, reusing reverse side of one sided paper, car pools, telecommuting, recycling programs, automatic switching off lights if possible after a certain time, turning off computers, using energy efficient products, brown bag policy in canteens and use of drink ware instead of plastic or foam cups.

Investment in greening technology is must and this can be done by leveraging with low labour costs. Secondary markets should be discovered for recyclables. Information sharing and joining efforts with other members of supply chain is vital. Outsourcing can lead to cost as well as environmental benefits.

Transportation Management System software can optimize routing and result in fuel minimization. Supply Chain mapping, also called Value Mapping should be used to define improvement areas and sources of waste. Various tools like Supply Chain Analysis/Optimization Tool (SEAT) (CleanMetrics 2009), Carbonview etc. can be used to model supply chain elements and improve their performance.
Supply chain visibility and transparency of processes can lead to optimization of processes removing duplicity and redundancy and reduction in shipment and inventory. This will help reduce carbon footprint. Green packaging and labeling are a must.

Only green suppliers should be partnered with, otherwise educating and funding the present ones for their greening should be done. Customers should be made aware that the company’s products are superior as they have made all their processes green and are not polluting the environment.