



A Study of Green Supply Chain Management in Pulp and Paper Industries

Sabrina Shaikh

EasyChair preprints are intended for rapid dissemination of research results and are integrated with the rest of EasyChair.

February 12, 2020

A Study of Green Supply Chain Management in Pulp & Paper Industries

Sabrina Shaikh¹

¹Department of Mechanical Engineering, VIVA Institute of Technology, Mumbai University
Email: shaikhsabrina23@gmail.com

Abstract—With the increasing competition to do good business, companies have already created many environmental issues. The stress on the environment is increasing as the level of energy and material intake is also increasing with increasing pollution from various sources, resulting in inadequacy of resources and dilapidation of the environment.

The purpose of this thesis is to create an agenda that can be used by supply chains, particularly in the supply chains from the pulp and paper industry, to develop inner strengths and faintness and external openings and threats to develop environmental policies to recognize. To identify what questions to use in the framework of the environmental approach, we first identified the environmental picture, which the pulp and paper industry is facing. We then used this and the principle of green supply chain management to explore how a non-integrated supply chain firm could become greener, and compared it to an integrated green supply chain firm. Our conclusions suggest that the industry is focusing on reducing greenhouse gas emissions, but there is still much effort that needs to be done. Hence as a case study the supply chain management of THERMAL PAPER MANUFACTURER ASSOCIATION INDIA is reviewed.

Finally, we therefore present an environmental deliberate framework to explain what strategic options are in this particular supply chain that can make them greener. The general environmental outline presented can be used as a strategic tool to identify environmental strategic options for the supply chain.

Keywords— agenda, dilapidation, faintness, inadequacy, non-integrated,

I. INTRODUCTION

In 2010, the world's greenhouse gas emissions were the highest in history. The implications of this may not be known, but conducted research suggests that increased activity following increased industrialization may be the result of climate change that we are experiencing today. They are spread in the atmosphere. If the amount of emissions increases, then the earth's mid-temperature is higher than the constant. Researchers say that if the global middle temperature rises above 2 ° C by 2100, there is huge potential for "dangerous climate change" (Harvey, 2011). This causes scarcity of food and water in the areas where it lives today, while other areas flourish. One of the consequences of climate change is that it leads to a more unequal distribution of global resources in today's context, leading to mass extermination and conflict. Clearly there is a need to take action. With the establishment of the United Nations Environment Program (UNEP), in 1972, environment and sustainability became a subject of international policy. Since then it has inspired and encouraged governments and private companies to become environmentally conscious. A number of initiatives have been launched to improve the global environment, environmental organizations have been established, and new technology has been discovered in continuous work. The word sustainability hits everyone's lips, and by searching the word "durable" on Google, one gets 129 million hits. The Report of the World Commission on Environment and Development is the definition of our general future "sustainable development" ("Planning Commission Report on Environment and Development" (1987)). Sustainability consists of three aspects: economic, environmental and social responsibility. Previous studies have focused mainly on theoretical approaches to Green Supply Chain Management for Integrated Supply Chains. In this unique non-integrated supply chain, raw material is wood and the end products are notebooks and printing paper. Since timber is used to produce many different products, it is considered a separate supply chain. With this study, we hope to see what different businesses are doing along the supply chain and give some new insights and see how the system is turning green. If we could say anything about the degree of non-integrated supply chain of environmental action, we had to compare it to another supply chain in the industry, so we'd like to see the European company UPM, which has a more comprehensive supply. Chain. For the production of their paper. When studying the two supply chains we looked at the environmental dimension of sustainability and hence the term "green supply chain". Supply chain to convert raw tubes into finished products. Green Supply Chain Management (GSCM) to make the entire

supply chain more environmentally sustainable. Companies can choose to adopt GSCM for a number of different reasons: due to laws and 11 regulations, eco-friendly can use GSCM to set itself apart in the competitive industry and eventually get you to run GSCM to stay competitive. Competitors have already received the adopted GSCM. Therefore, this research paper addresses the question of this comprehensive non-supply chain.

II. PROBLEM DEFINITION

The paper is a bio-degradable product and has a benign footprint at the end of its life cycle. The paper industry is growing year by year. The paper industry has a very important role in the global economy. Annual revenues from the region exceed US \$ 500 billion. In 1981, global paper and board consumption increased from 169 million tons. Current consumption is 400 million tons. The 12 large units of country medium and small paper mills account for 30% of the production share and 70% of the remaining units. Wood-based industry accounts for 35% of the product, while waste paper and agricultural residues account for 44% and 21%, respectively. Indian paper industry is an integral part of the country's economy and contributes to its growth and development.

Problem and its effects:

Large and growing domestic markets: India's large and rapidly growing domestic market, growing financial market, large population and stable democratic government make it an attractive market for investors. However, India is weak compared to its vast capacity. The Indian Paper and Newsprint industry has huge potential and opportunities in the future.

Small and fragile industries: Construction business development risks are primarily related to the company's strategy and risks related to the supply and availability of natural resources, raw materials and energy. The industry hopes to reduce business volatility by creating a less cyclical portfolio. Its goal is to maximize profits through Greenfields, inorganic growth options and operational improvements to the current production base. In addition, growth may affect export prices in markets.

Meeting Paper's Increasing Demand: Of course, the paper industry is out of control and there is no price control over the final product. As a result, the entire cost is shifted to the end users. Newsprint prices rose 24% in a short span of three months to \$ 760 a ton since December 2007, an increase of \$ 145. India also imports most of its Newsprint from abroad. From North America, we imported 18.9 lakh tons in 2004 and 26.45 lakh tons in 2007, with a CAGR of 11.9% (compounded annual growth rate).

Productivity / Quality Improvement, Environmental Update and Green Technology:

Air pollution.

Noise pollution: The main source of noise pollution within the paper mill is derived from the vacuum pump. We installed special silencers to reduce noise.

Water Use: The company is focused on reducing water use by reusing as much water as possible.

1. The target currently taken is 90 cubic meters / afternoon paper. Much lower than set standards.
2. Establish mechanisms for collecting, sorting, grading and using recyclable waste
3. Depending on the type of raw materials, freshwater paper users consume in the range of 80–150 m³ / t. In general, farm-based mills consume more water than RCF-based mills. Various chemicals (thiols, sulfur dioxide, sulfite and sulfide, fiber and resins), bleaching agents (hydrogen peroxide, chlorine dioxide, and caustic soda and whitening agents (kaolin, calcium carbonate, talcum titanium), and titanium, titanium, titanium, and titanium. Environmental concern.

III. MATERIAL AND METHOD

Paper is made through the following processes:

Raw Materials Making: The wood obtained in the pulp mill comes in various forms. It depends on the pulling process and the source of the raw material. The bark is attached in the form of round-wood bolts and can be obtained in the form of chips, about half a dollar in size, from round wood produced from area.

If round timber is used, it is first dabbled, and wash water is usually applied by tumbling into large steel drums. If the pulping process calls for chemical digestion, paste those wooden bolts into the chipper. The chips are shaped, cleaned, and stored temporarily for further processing.

Fiber separation: During the fiber partition phase, many pulling techniques are deviated. The chips are placed in a large pressure cooker (digester), which contains a chemical suitable for craft chemical pulping.

The chips are then digested by steam at different temperatures to separate the fibers and partially dissolve the lignin and other essences. Some digesters work continuously with a continuous feed of chips and the alcohol is intermittently charged and treated one batch at a time.

After the digestion process, the ripe pulp is released into a pressure vessel. Here the vapors and volatiles are closed. After that, this ripe pulp returns to the chemical recovery cycle. Fiber separation is less dramatic in mechanical pulp.

The process of masonry-floor timber forces the removed logs against rolling the stone wheels. Refiners are made by pulp and thermo-mechanical pulp chips. These chips are grounded by turning rapidly in two processes.

In the second step after cleaning, the pulp is scrubbed, rinsed, and most processed water is removed in preparation for making the paper.

Bleaching process:

The lignin and other discoloration in raw mash is so high that it needs to be bleached to produce a light-colored or white paper that is preferred for most products. The fibers are further transported by dissolving excess lignin from the cellulose through chlorination and oxidation. These include chlorine dioxide, chlorine gas, sodium hypochlorite, hydrogen dioxide and oxygen.

Strong alkaline sodium hydroxide is used to remove dissolved lignin from the surface of the fibers. Bleaching agents and the order in which they are used depend on a number of factors, including the relative cost of the bleaching chemicals, the type and condition of the pulp.

Mechanical pulp bleaching is different from chemical pulp bleaching. Bleaching of mechanical pulp is designed to remove lignin, which reduces fiber yield.

Chemicals used for chemical bleaching choose paint impurities, but include sodium bisulfite, sodium or zinc hydrosulfite (not used in the United States), calcium or sodium hypochlorite, hydrogen or sodium peroxide, and sulfur dioxide-boroalkaline lignin and cellulin. Process (variation of the SO dime hydrosulfite method).

Paper Manufacturing Process:

Bleaching or uncooked pulp can be further refined to cut the fibers and the surface of the fibers will be thickened to increase the formation and bonding of the fibers as the fibers enter the paper machine.

Water is usually added to the pulp solution to form a thin mixture with less than 1% fiber. The dilute solution is cleaned in a storm cleaner and placed on the centrifugal screen before being fed into the 'wet end' of the papermaking machine. The thin stack passes through the head-box, which is uniformly distributed over the width of the sheet of paper forming the fiber solution.

IV. CASE STUDY

By studying this non-integrated supply chain, we have noticed that Thermal Paper Manufacturing Association is trying to make India greener, but using different methods. One common point is that they set certain environmental goals that they want to achieve, but they use different measures to reach them and are part of different activities with a different focus.

Green Design: Thinking green when designing can make a big difference to a company's product and environmental profile. Green design also does not appear to be a major focus for industry participants. They use "e-wheels" to understand and assess the environmental impact of their products. This cycle is divided into five stages: raw materials, manufacturing, distribution, use and end of life.

Green packaging: It is not easy to estimate how much packaging is required for paper, but it is reasonable to assume that they are covered with something before shipping. Packaging is a big part of the operational life cycle, and because of this there are many ways to change the packaging process that makes up the supply chain. A greenhouse solution can be developed by using environmentally friendly materials for packaging

Green procurement: Green collection consists mainly of forest management and production facilities. To verify a product, the entire supply chain from the jungle to the mills and the final product must be verified. Forest managers have systems for Sustainable Forest Management (SFM), and forest product traders rely on chain verification to find out the origin of the products.

Green Production: Thermal manufacturers are constantly working with improvements in their production process, which is environmentally friendly. He introduced his own e-index to more easily follow the company's environmental reforms. They set annual targets for 48 different parameters of the e-index and calculate the total e-index score for the entire company. His e-index

score in 2016 was 1.14, which is below his 2015 target of 1.09. An index value of 1.0 or less indicates that the mill has an environmental standard that satisfies the performance achieved by the best technology or best practice available to the mill.

Energy: Paper production is a very energy efficient process, and most of the greenhouse gas emissions come from the energy they buy and produce to operate their mills. They use energy for two purposes: implementing production processes that separate fiber and water, and provide process heat and dry paper. They are trying to reduce various methods of energy reduction such as solar and wind to meet environmental standards.

Water: Water is used to grow fibers through the system in the process of pulp and paper production. 92 percent of the water comes from thermal producer surface water, and is used to cool machinery and equipment. Eighty percent of the water comes from groundwater, and only a small part comes from municipal water, which enters the production process through purchased raw materials as water is present in fiber-based raw materials. Thermal manufacturers have stated in their annual reports that the water they use is not overused, and that the water cycle is reused after treatment and treatment, permitting the use of water according to local regulations. When released, water undergoes therapeutic processes that remove solid particles and dissolve organic matter before it returns to nature. Water is usually used several times before treatment and returns to the water cycle

Waste: Reducing the waste to landfill has been the main challenge for the industry, as the production process generates large amounts of waste. New innovations of technology have made it possible to make use of the waste though, and the paper producers are therefore continuously trying to reuse or recycle most of their waste. Especially the usage of waste for biofuel is something other paper producers are doing. However, Thermal manufactures does not seem to be successful when trying to reduce waste to landfill as the numbers has increased over the last few years. It is especially the production process with recycled paper that creates a lot of waste, because of the deinking process. It seems therefore somewhat strange that they sold their Chinese mill that used only recycled paper, and still the amount of waste to landfill is increasing. Unlike for water, the waste handling is not the same in different regions of the world.

V. CONCLUSION

We have examined various aspects of green supply chain management to improve environmental sustainability in the pulp and paper industry. After studying the non-integrated and integrated supply chain in this particular industry, we have developed a general framework that can be used as a strategic tool for identifying environmental strategies for supply chains in the pulp and paper industry. This framework is well suited to the pulp and paper industry, but it can also be applied to other industries with some adjustments.

Green Supply Chain Management is a new field and we thought it would be difficult to find good theoretical literature that addresses this issue. The literature we find focuses on very general or concrete topics, which companies have told or told stories about. We therefore provide a working environment framework for our entire supply chain system, looking at case studies from a specific non-comprehensive chain. Our research is challenging and somewhat confusing. Our research is challenging and somewhat confusing. An interesting finding is that many companies are very good at demonstrating the green actions they are taking, but neglect to mention what they cannot. In addition, there are many international programs, organizations and reporting systems, each with their own way of measuring and recommending goals.

ACKNOWLEDGEMENTS

After the completion of this work, I would like to give my sincere thanks to all those who helped me to reach my goal. It's a great pleasure and moment of immense satisfaction for me to express my profound gratitude to my guide and Principal Dr. Arun kumar whose constant encouragement enabled me to work enthusiastically. Her perpetual motivation, patience and excellent expertise in discussion during progress of the project work have benefited us to an extent, which is beyond expression.

Last but not the least I would also like to thank all the staffs of VIVA Institute of technology (Mechanical Dept.) and also the staffs and associates of the Thermal manufacturers for their valuable guidance with their interest and valuable suggestion brightened me.

REFERENCES

1. Anttilainen, S. & Salenius, M. (2007) Saugbrugs PM 6. volume 9, issue 3,
2. Bio Oil AS (2011) Home. Bio Oil AS. Available from: [Accessed 22.03.2011]
3. Bårdsgård, H. (2011) Håp for miljøstandard i skog. Norway, Nationen. Available from [Accessed 04.06.2011]
4. Carbon Disclosure Project (2009) Home. England,
5. Carbon Disclosure Project. Available from: [Accessed 30.05.2011]
6. Carbon Disclosure Project Nordic Report (2010)
7. Carbon Disclosure Project. Available from: [Accessed 21.03.2011]
8. Carbon Disclosure Project Supply Chain Report (2011) ATKEARNEY,
9. Carbon Disclosure Project. Available from: [Accessed 13.04.2011]