

Optimisation Of Supply Chain System In Pulp And Paper Industry For Sustainable Production And Profitability

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ABSTRACT

In tough economic conditions, it is essential for an enterprise to look at innovative ways to cut costs without cutting corners. Efficient management and a better understanding cost of existing supply chain and positions the enterprise in a better situation to review and, if necessary, realign and optimise the supply chain to reduce costs without compromising on the value. With this, the pulp and paper industry is stepping into a new phase of business evolution driven by consolidation of industry, globalisation and ever-increasing competition. These market drivers are forcing the pulp and paper industry to put a greater focus on cost efficiency. These focuses are creating totally new challenges for the organisation, specifically in the IT area. Managing change becomes more and more difficult. Many pulp and paper mills have come to a point where a more radical rebuild and renewal of the entire IT and network environment is required. Fortunately, the conditions for this have improved over the last few years, due largely to an increasing range of commercially available application platforms adopted for the pulp and paper industry, the acceptance of common industry standards, and the evolution of refined integration and migration methods. Thus, supply chain management involves all the activities associated with moving goods from raw materials stage through to the end user or customer, it coordinates and integrates all the activities into a seamless process. It links all of the partners in the chain of paper industry, i.e.: planning process, plantation activities, finance, materials procurement, production, sales/ marketing, HR activities, converters, vendors, transporters and major customers to work together for sustainable production and profitability.

INTRODUCTION

The Indian Paper Industry accounts for about 1.6% of the world's production of paper and paperboard. The estimated turnover of the industry is Rs 25,000 crore (USD 5.95 billion) approximately and its contribution to the exchequer is around Rs. 2918 crore (USD 0.69 billion). The industry provides employment to more than 0.12 million people directly and 0.34 million people indirectly. The industry was delicensed effective from July, 1997 by the Government of India; foreign participation is permissible. Most of the paper mills are in existence for a long time and hence present technologies fall in a wide spectrum ranging from oldest to the most modern. The mills use a variety of raw material viz. wood, bamboo, recycled fiber, bagasse, wheat straw, rice husk, etc.; approximately 35% are based on chemical pulp, 44% on recycled fiber and 21% on agro-residues. The geographical spread of the industry as well as market is mainly responsible for regional balance of production and consumption. With added capacity of approximately 0.8 million tons during 2007-08 the operating capacity of the industry currently stands at 9.3 million

tons (1). During this time of economic instability in Indian Paper Industry due to Global financial melt down, non availability of raw material, un precedented cost escalation of other inputs for paper making, added to this fall in demand for paper, there is an increased pressure on leaders, managers and technology management professionals to design impacting and efficient strategies to improve organizational performance. Budget cuts, downsizing and organisational restructuring all threaten employee engagement and organizational performance. Strategic Business leaders are actively seeking practical ways to guide their organisations

through this difficult time. In fact, the pulp and paper industry depends on a long and integrated supply chain, It starts with Plantation activity for a wood based mill and procurement for Agriculture residue / Recovered Paper based mills. Starts from procurement stage and ends as multiple products used in industry / personal daily use. The lead time from first to last is long and it involves many steps operated by various Departments and Sections.

WHAT IS SUPPLY CHAIN SYSTEM ?

The Paper Industry is highly cyclic and with traditional way of working, these

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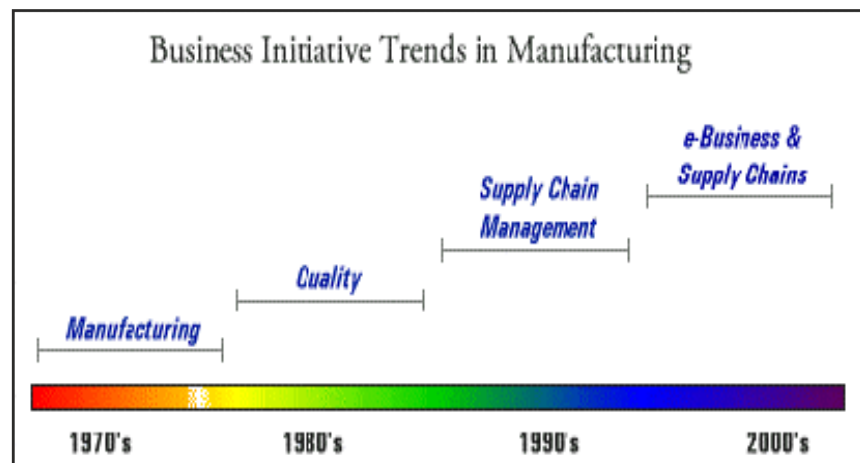


Fig-1

MAIN ELEMENTS IN A SUPPLY CHAIN SYSTEM

Raw Materials

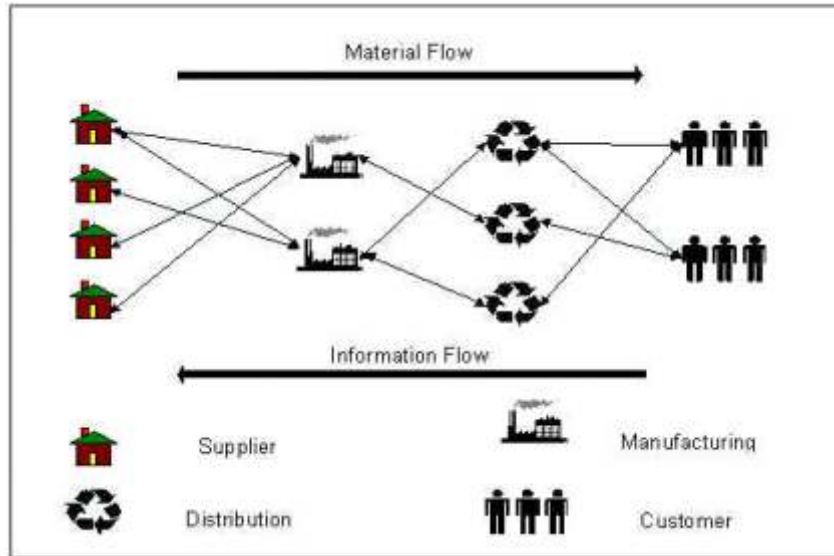
--> Supply

--> Production

--> Distribution

--> Customer

Fig-2



SUPPLY CHAIN MODEL (Fig-3.)

companies use subjective parameters to manage the demand resulting in loss of business, inefficient use of their resources, lack of effective planning and high operating costs. Initially these industries mostly were focusing on manufacturing and later on quality of the products. Days are changing. Now the focus on totality of the business is important. Fig-1, shows the industry's shift in focus over the years to supply chain management and its improvements to reduce costs and effectively position their resources to manage the demand. Fig-2. shows the main elements in the chain. Fig-3. explains a simple supply chain model and flow of material and information (2).

UNDERSTANDING OF SUPPLY CHAIN SYSTEM IN A PAPER INDUSTRY

The pulp and paper industry produces a variety of papers and other cellulose based fiber products. There are a large

number of activities involved in the chain behind these products, from planting of the seeds of the trees producing cellulose to the product used by the final consumer. Such a network of activities is known as a supply chain as shown in Fig-4.

The starting point in the supply chain of a wood based paper industry is the wood available in the harvest areas. After harvesting takes place, the wood is procured and transported to several locations such as , wood depot, mill yard where logs are stored as raw material inventory and sent to the production facilities where the wood is cut in to the chips, processed into pulp and later to the paper manufacturing and converting facilities. Thereafter the distribution of the finished products to the dealers , to the market and from there to the final consumer (3).

Major benefits by adopting the supply chain system are as

Customer Satisfaction	Reduced Inventories
Lower Operating Costs	Product Availability
Faster Delivery	Reduced Lead Time
Flexibility	Competitiveness

follows:

Effective management system must account coordinate all the different links of supply chain as quickly as

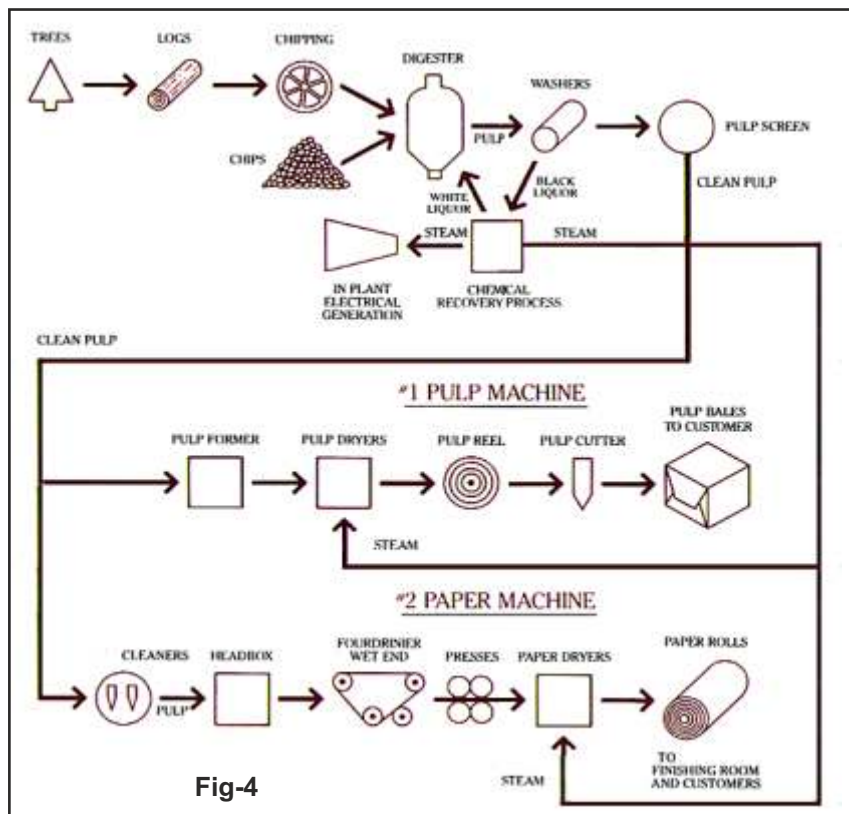


Fig-4

possible without losing any of the quality or customer satisfaction, while still keeping costs down. In addition, key to the success of a supply chain system is the speed in which these activities can be accomplished and the realisation of the customer needs and customer satisfaction are the very reasons for the survival.

THE DILEMMA AND THE BULLWHIP EFFECT IN A SUPPLY CHAIN SYSTEM

THE DILEMMA

Inventory control is a key element in supply chain management. The inventory relationship between supply chain components contributes to the cultural and attitudinal relationship. Very often, the cost of inventory determines if an individual component is very profitable, barely profitable or is not profitable. Each component of the chain is faced with the Generic Inventory Dilemma. To have an excellent inventory management system, industry should have enough inventories to prevent stock-out situations. In today's fierce competitive environment, stock-outs drive the customers to the competitors and they are hard to win back. To have an excellent inventory management system, industry must minimise the cost of inventory. The cost of inventory can make or break. In the typical supply chain, individual components are separate entities that depend upon each other. They pass money and materials back and forth. Each component adds value to the product, but in reality, there is no real value produced until a

customer is satisfied. Fig-5. explains the relation between customer service and inventory (4).

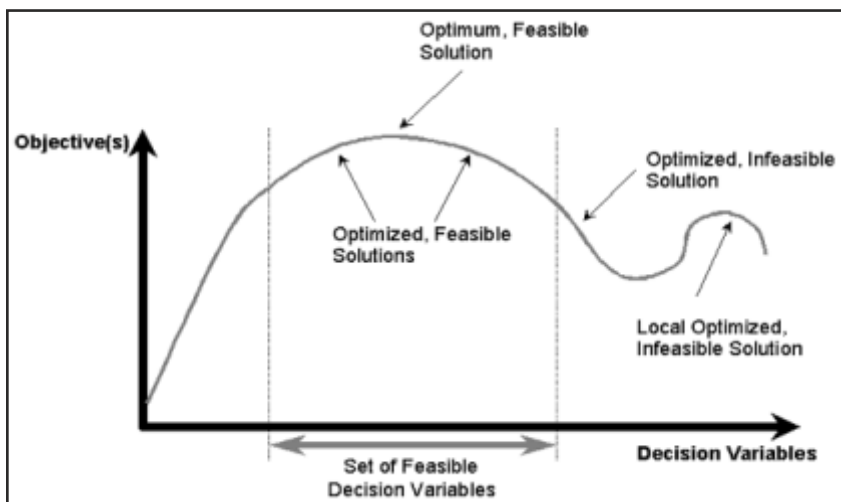
THE BULLWHIP EFFECT

The bullwhip effect stems from a number of sources. First, traditional inventory management techniques practiced at each level of the supply chain lead to the bullwhip effect. This is due to the need of each level in the supply chain to forecast demand. An important characteristic of all forecasts is that the more data received the more is modified in the forecast and therefore the inventory policy, leading to an increase in variability. Second, volume discounts, transportation discounts and promotional activities tend to destroy the structure of customer demand, forcing retailers to

order less frequently than customer demand, and therefore increase variability in the supply chain. Finally, the longer the lead-time in the supply chain the larger the increase in variability. Obviously, the bullwhip effect has important consequences. As variability in the supply chain increases, inventory levels increase, or alternatively, service levels decrease. In addition, the increase in variability makes it very difficult for warehouses and the mills to manage resources effectively. It will not be clear whether resources should be managed based on peak demand or on average demand. Either way, cost will increase (5).

OPTIMISATION OF SUPPLY CHAIN SYSTEM

Supply Chain Optimization is the



OPTIMISATION CURVE
Fig-6.

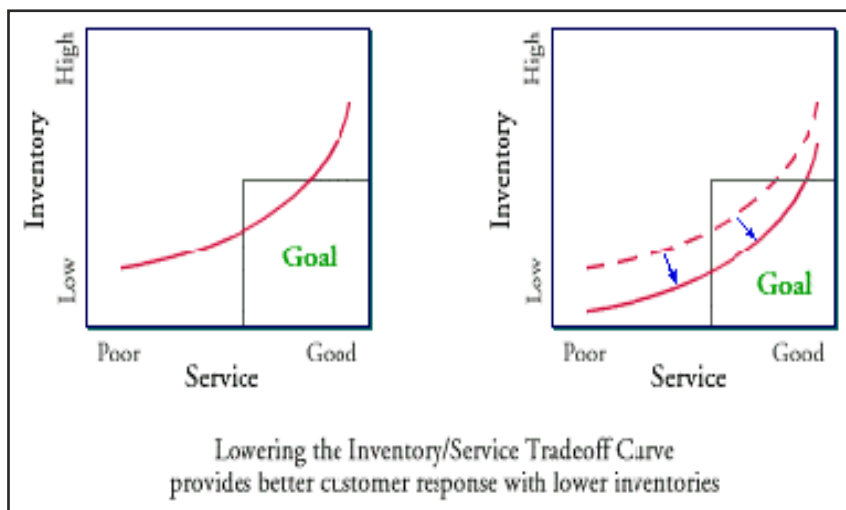


Fig-5

application of processes and tools to ensure the optimal operation of a procurement, manufacturing and distribution supply chain system. This includes the optimal placement of inventory within the supply chain, minimising operating costs (including procurement cost, manufacturing costs, transportation costs, and distribution costs). This often involves the application of mathematical modeling techniques using computer software (6). Fig-6, Explains the limitations of Optimisation in a supply chain system.

NEED FOR ERP IN PAPER INDUSTRY

ERP stands for "enterprise resource

planning". The definition of enterprise resource planning is an integrated software solution used to manage a company's resources. ERP systems integrate all business management functions, including planning, inventory/materials management, engineering, order processing, manufacturing, purchasing, accounting and finance, human resources, and more. Hence application of ERP in paper industry will be profitable.

HOW ERP FACILITATES SUPPLY CHAIN FUNCTIONS IN A PAPER INDUSTRY?

Supply chain is an important process that includes the controlling and deciding the direction of resource movement in an organisation. It also includes all other sub process involved in coordinating them. The concept of supply chain and its management is not a new one in the paper industry. It has been in existence from yester years. Today's ERP systems can cover a wide range of functions and integrate them into one unified database. For instance, functions such as Human Resources, Plantation activities, Customer Relations Management, Financials, Manufacturing functions and Warehouse Management functions were all once stand alone software applications, usually housed with their own database and network, today, they can all fit under one umbrella, reduce the inaccuracies and increased the performance of "the chain /plan of sustained paper trading." (7).

ADVANTAGES OF ERP SYSTEMS IN A PAPER INDUSTRY

There are many advantages of implementing an ERP system; here are a few of them:

- A totally integrated system
- The ability to streamline different processes and workflows
- The ability to easily share data across various departments in a mill/ organisation
- Improved efficiency and productivity levels
- Better tracking and forecasting
- Lower costs
- Improved customer service

PAPER MILL ACTIVITIES WHICH CAN BE BROUGHT UNDER ERP (8)

Planning :

Annual planning/budgeting, Collaborative Demand Planning, Material Planning, Capacity Planning.

Plantations :

Farmer Registration/Recruitment, Crop Survey by Marketing and Extension, Plantation Booking and Payments, Materials & Supplies, Inventory Management.

Manufacturing :

Pulping operation, Secondary Fiber Treatment, Paper and paper board Production, Finishing House operations, Utilities, Engineering, Manufacturing Analytics, External Sheeting/Conversion.

Sales & Marketing :

Collaborative Demand Planning, Sales co-ordination, Pricing, Domestic/Export Sales, Analytics.

Materials :

Procurement Domestic/imports, forest products, receipts, issues, Incoming quality, waste disposal, rejections, Warehousing and dispatch.

Finance :

Payable, Receivables, GL, Projects, Capex / Fixed Assets,

Funds, Costing, Financial Reporting, Insurance.

Human Resources :

Recruitment to Retirement, Training & Development, e-learning, Integration with Shop-floors, QCS / DCS . Projects, EHS, Product Development, Quality , EHS and Product Development.

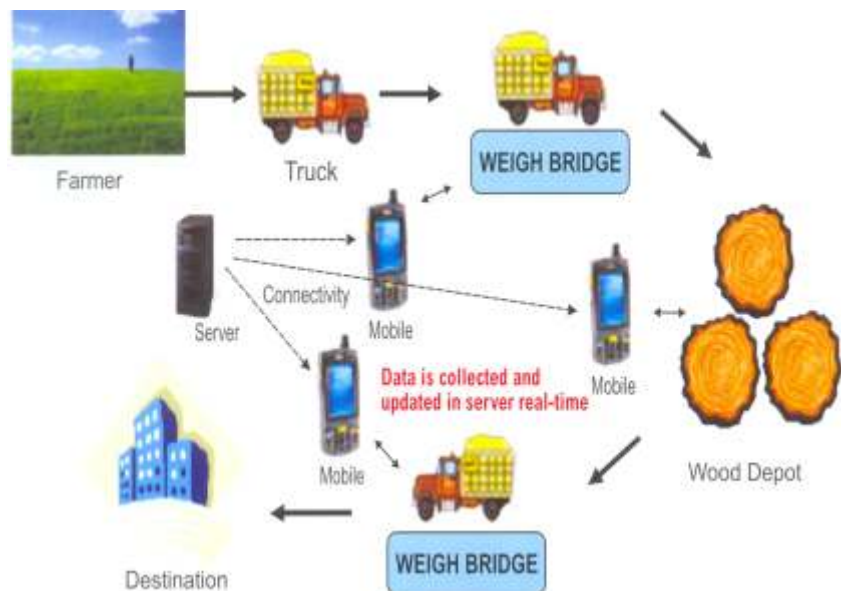
A TYPICAL EXAMPLE : OPTIMISATION OF SUPPLY CHAIN SYSTEM IN PROCUREMENT OF PLANTATION WOOD

In most of the Indian paper mills, wood procurement recordings are done manually . In future all , the wood Depots. and weighbridges can be connected on line with suitable locally available devices (9).

Fig-7. Shows a pictorial view of an effective supply chain system in Plantation wood procurement.

The following activities can be incorporated.

- Registering the farmer/ land, species, expected harvesting time, yield and allocation to a depot.
- Capture weight of the vehicle carrying wood to yard/mill and prepare the weighment card.



Flow of Material and Information in Plantation Wood Procurement
Fig-7.

- Compare the gross and tare weight against the each vehicle.
- Incorporate mobile registering system.
- Quality wise raw material inventory data can be generated at respective cluster depots.

STEPS FOR SUSTAINABLE PAPER PRODUCTION AND PROFIT MAKING

Many organisations are evaluating their supply chains because they are perceived to be an area for both cost cutting and increasing competitiveness. In reality , Paper mills can not have identical supply chain system. The objective is apparently very simple; optimise the existing supply chain via effective and efficient operating practices with a right software system (10). Apart from these, the following long term strategies will make the Paper mill activities sustainable and profitable.

- Focus the brand portfolio.
- Build an enterprise culture.
- Pioneer new channels.
- Reconnect with customers.
- Reach for a world class supply chain system.

CONCLUSION

Pulp and paper industry has a very

distinct feature that its raw material can not be stored for long duration. Thus its production process, inventory management and other functions should be very well planned and managed as there is always a very tight schedule for entire process cycle. Automated supply chain management tools enable businesses to manage the supply chain at optimal efficiency, to reduce friction when there is a breakdown in the supply chain and locate the least-cost alternate sources that satisfy requirements for needed parts and supplies. Advantages usually outweigh disadvantages for most of the Paper mills in implementing an ERP system. Usually many obstacles can be prevented if adequate investment is made and adequate training is involved. However, success does depend on skills and the experience of the workforce to quickly adapt to the new system.

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