CHAPTER-2
LITERATURE SURVEY

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This literature survey extracts information from some of the literature available on this subject. It does not claim to be complete nor does it take a position towards the opinions expressed in these articles. The information is grouped along the two discussion lines:

1) International Literature Survey
2) National Literature Survey

2.1 INTERNATIONAL LITERATURE SURVEY


Coordination of the participants in the supply chain of a manufacturing enterprise is a key to agile reaction to unexpected events. As a starting point, we take a mediated approach to coordination: a single agent is responsible for recovery of the supply chain from a disruptive event. This mediator gathers commitment information from other agents and forms a constraint graph. If the event is truly disruptive, this graph will reflect infeasibility: a subset of agents can no longer meet commitments. Repair of the graph is done via constraint relaxation controlled by the mediating agent. We present a schema for constraint relaxation algorithms and experimental results on Partial Constraint Satisfaction Problems (PCSPs). We sketch the coordination protocol that is being developed.


Increasing recognition is being placed, both in industry and in academia, on effective supply chain management. The term supply chain management
presupposes that there exists a supply chain to be managed. With a focus on supply chains in which demand uncertainty is the key challenge, this dissertation develops strategies and models to aid in the design of certain supply chain features, namely capacity, flexibility and wholesale price schedules.

Firstly, this dissertation studies capacity investments in single-product supply chains in which the participants make investments to maximize their individual expected profits. Using a stylized game theoretic model of a supply chain comprising a supplier and a manufacturer, simple non-linear wholesale price schedules, whether they be quantity premium or quantity discount schedules, are shown to outperform simple linear schedules in terms of the total supply chain profit achieved. Next, this dissertation then extends the work of Jordan and Graves (1995) so as to develop process flexibility strategies for multiple-product multiple-stage supply chains. Finally, this dissertation studies the capacity decision in multiple-product multiple stage supply chains. Solution approaches to the capacity investment problem in which there is either an expected shortfall bound or a service level bound are developed.


This paper outlines the need for effective management of supply chain in Indian context and brings out the problems and challenges of logistic system and lists strengths, weaknesses, opportunities and threats in each with specific thrust on the role of IT & communication in supply chain management. A number of stories are indicated along with the need to look at supply chain from a system point of view and use OR/ MS techniques in design and operation of logistics systems.

The dual pressures of global competition and high returns have shifted the paradise of strategic competitive advantage from physical distribution management to integrated logistics management, finally moving over to supply chain management. Conventionally corporate profitability is a function of cost, capital employed, revenue and customer service. The article gives an insight into the effect of supply chain management on each of the above variables. It traces its impact on the spiraling effect on corporate profitability and the means of measuring supply chain effectiveness financially. Information technology tools from the basis of supply chain optimization in this context of ever increasing demand for dynamism in business decision, giving rise to a new era of virtual supply chain and naturally aligning supply chain system.


In this paper, the role and the importance of transportation as key a process in the integrated logistics management is stressed initially. The problems and issues faced by the policy makers, industries, shippers, suppliers, regulatory agencies and the end users are highlighted in greater detail. The present efforts by our government and the possible fall outs are discussed and towards the end, the strategies for a powerful tool aligning with the IT advantage are discussed.

The supply chain is a worldwide network of suppliers, factories, warehouses, distribution centers, and retailers through which raw materials are acquired, transformed, and delivered to customers. In recent years, a new software architecture for managing the supply chain at the tactical and operational levels has emerged. It views the supply chain as composed of a set of intelligent software agents, each responsible for one or more activities in the supply chain and each interacting with other agents in the planning and execution of their responsibilities. This paper investigates issues and presents solutions for the construction of such an agent-oriented software architecture.

The approach relies on the use of an agent building shell, providing generic, reusable, and guaranteed components and services for communicative-act-based communication, conversational coordination, role-based organization modeling, and others. Using these components, we show two nontrivial agent-based supply-chain architectures able to support complex cooperative work and the management of perturbation caused by stochastic events in the supply chain.


Recently more attention is given to Environmental Supply Chain Management (ESCM). One of the supporting instruments of ESCM is Life Cycle Assessment (LCA). The idea of integrating LCA into supply chains is gaining more support among research institutes and companies. However, we conclude that there are no guidelines for this integration. In this paper we argue that in line with a differentiation in environmental care chain strategies and in environmental chain performances, a differentiation in types of LCA’s should be made; the
compliance-, process- and market-oriented LCA. To execute these different types of LCA, the chain structure should be attuned to meet the specific requirements of these types. In an overview we will show that the integration of the types of LCA in a chain, bring along different chain structures.


Over the past decade a combination of economic, technology and market forces has compelled companies to examine and reinvent their supply chain strategies. Some of these forces include the globalization of businesses, the proliferation of product variety, increasing complexity of supply networks, and the shortening of the product life cycles. To stay competitive, enlightened companies have strived to achieve greater coordination and collaboration among supply chain partners in an approach called “supply chain integration.” Visibility in these Supply Chains means “Firms will complete Supply Chain to Supply Chain”, according to new study.

In an era of global supply chains, companies will effectively compete for survival with their competitors through achieving higher levels of visibility into their supply chains and the actionable information that come out of it, according to “From Visibility to Action,” the 13th annual report on trends and issues in logistics and transportation issued jointly by Capgemini U.S. LLC and Dr. Karl Manrodt.


The primary difference between analyzing a supply chain and analyzing a production system or a distribution system is that in a supply chain, we may
have to simultaneously consider different and sometimes conflicting objectives from different participants, or different departments within the same participant. For example, minimizing production costs at the production department may have to be carried out by taking into account the distribution costs at the distribution department.

Similarly, minimizing distribution costs at the distribution department may have to consider the delivery lead time performance. Or, optimizing the distribution costs at a supplier by sending large shipments may have to put up with an increase in the inventory holding costs at the warehouse. Though production scheduling and distribution scheduling have separately been studied extensively, very little work has been done that integrates these two operations in supply chains. Supply chain level decision making is very crucial for most of the businesses that exist today. This opens up a very promising area of research.


The purpose of this thesis is to describe logistics collaboration in supply chains. During the past two decades, a new trend towards integration and collaboration in supply chains has been recognised among researchers as well as among business practitioners. This philosophy is called supply chain management and has received enormous attention in logistics research.

Collaboration based on supply chain management is expected to reduce total cost and improve service towards the supply chain’s end customers at the same time. The argumentation in existing literature is however seldom underpinned by more rigorous empirical material and becomes therefore conceptual and superficial. Furthermore, it is incongruous about what actually is done when
companies collaborate and what more specific effects are achieved. Therefore more research, especially survey based, is needed in order to verify existing literature. In this thesis the perspective of a focal company is taken in order to concretise the ideas from supply chain management and investigate what it means for an individual company.


One of the widespread conclusions in supply chain management research is that huge benefits can be achieved if suppliers are involved in the OEM’s product development process as early as possible, since suppliers often possess vital product and process technology leading to significant improvements in product design and new product development process. The issue is a need for a model of supplier selection to support the contribution of suppliers in product development processes; whilst supplier attributes or performance metrics for traditional supplier selection do not seem to include specifications that are usually required in close relationships. What practitioners need in practice, is a simple-to-use methodology with producing logically precise results.

The purpose of this study is developing a model of supplier selection to support the contribution of suppliers in product development processes, and eventually, developing a strategically integrated supply base for Volvo Power train Corporation (VPT). Among the first part of this study, a model of supplier evaluation and selection has been developed, considering attributes and success factors for integration with suppliers, and also examined in VPT with the aims of achieving mutual success in both products and commerce for VPT, as the focal company, and its supply chain members. The second part of this study presents a model to boosting the integrated partnership established on the basis of the first part endeavour.

In a competitive business environment that requires strategy and innovation to improve the bottom line, supply chain management has been vital in creating competitive advantage. Increasingly, companies are also identifying sustainability as an opportunity to create competitive advantage. This project explores supply chains as a leverage point in advancing sustainable development. Corporations have developed different tools to interact with their suppliers on sustainability. Three of these devices were analyzed against a framework for strategic sustainable development to identify some of their strengths and weaknesses. A general set of criteria for sustainable supply chain management devices that employs a strategic, whole-systems perspective was then developed.


The paper deals with the unique characteristics of Biotechnology sector and issues related to managing the supply chain for a biotech company. The authors have discussed the special characteristics of biotech products and challenges in handling and transporting them. The significant costs involved in transporting and handling the biotech products make it an area of focus for the biotech companies. By managing their supply chains effectively, the biotech companies can achieve competitive advantage and ensure overall saving to the customer resulting in customer satisfaction.

With rapidly increasing competition and changing market forces, supply chain performance measurement is a critical area for companies to help sustain and gain competitive advantage. This paper presents the development of supply chain performance measurement system for the leading soft drink distributor in Nagpur. On the basis of framework developed, the hierarchy of metrics approach is used for the development of performance measurement. At the highest level, the performance measurement system defines the metrics which measure and verify the supply chain goals. At lower level a balanced set of metrics are identified which are mapped to supply chain functions and the processes.


The advantages of adopting a new software system for Supply Chain Management (SCM) enable the organization to enhance work efficiency as well as customer satisfaction in the supply chain network. These advantages make enterprises update their SCM system through project as a method of realize their strategic change.
2.2 NATIONAL LITERATURE SURVEY


Managing perishable items pose a significant challenge in the supply chain environment. Food stuffs, dairy products, green vegetables, fruits are all items of daily human consumption. These perishable items have a finite usable lifetime, and pass many hands during its movement from source to destination.

The study of the supply chain of perishable products is particularly important because they account for more than 50% of supermarket sales, and the potential for extra profit from managing these items has been estimated at 15%. This thesis evaluates the channel dynamics and builds decision making models for supply chain of perishable items. To gain a primary understanding of the perishable item supply chain, the bakery supply chain of the ‘Monginis’ brand is studied. This is provided in the form of a case, the analysis of which is also provided. A framework for classification of the supply chain management (SCM) problems in literature is established. Theoretically this work can be seen as an amalgamation of two complementary fields, SCM and perishable inventory.

On account of high complexity and dynamic environment, chain dynamics are investigated through experiments, macro aspects (long term decisions) are evaluated using system dynamics models and micro structures (short term decisions) are optimized using mathematical models. Coordinated decision making is shown to be cost effective vis-à-vis individualistic views. The holistic supply chain is modeled using system dynamics formalism, specifying the dominant cycles of spoilage loop that drive the chain dynamics. The information feedback view of the system is used to identify and modify the
loops yielding better capacity augmentation decisions in short lifecycle products. This thesis demonstrates the presence of bullwhip effect for perishable item supply chain as well, and shows that it has lesser amplification and stabilizes faster when compared with non-perishable item. ANOVA results show a significant difference in performance metrics under various demand patterns and, to a certain extent, with the item type. An experimental method in the form of “Cake Game” is used to report the macro dynamics arising from the microstructure in a common managerial context.


The present industrial era can be characterized as knowledge based competitive era. Knowledge Management (KM) is an effective approach used by world-class organizations. One of the key challenges involves effective supply chain management under a globalization context. Global supply chains are more complex and involve multiple autonomous players with varying technical cultures (affects knowledge mindsets), managerial background (affects decision knowledge) and SCM exposures (affects knowledge sharing attitudes).

With increasing global outsourcing these supply chains are based on core competency of firms to achieve best value for the customers. Knowledge management has immense potential to offer expedient opportunities to create and retain greater value in this context. This includes the implementation of KM enriched supply chains by judicious use of information technology (IT). The development of knowledge based supply chain depends on the nature of knowledge flow in the entire chain.

Timely sharing of decision knowledge amongst the chain partners can be very useful. However this requires change in managerial mindsets. Thus there is a
need to develop demo models that can encourage chain managers towards collaborative-knowledge sharing in the supply chains. This paper presents the application of one such model based on decision knowledge sharing (DKS) for improved supply chain management. Its application across dynamic SCM networks reflects the benefits of integrating knowledge, which is actually spread across various components of the supply chains. We suggest efforts to improve effective KM based supply chain thinking and aim to promote collaborative knowledge sharing for performance improvements. There is a need for greater industrial research leading to the evolution of KM based supply chain management domain as it promises enormous benefits. Our research is continuing in this direction.


Building supply chains as flexible system represents one of the most exciting opportunities to create value. This requires integrated decision making amongst autonomous chain partners with effective decision knowledge sharing between them. For any decision process, one of the main inputs required is the available knowledge. Hence, it is important to have the actual real time knowledge for the decision process.

Knowledge sharing has immense potential to offer, expedient opportunities to create and retain greater value for supply chains. In this context, knowledge management (KM) can be used as an effective approach to achieve knowledge sharing and decision synchronization in supply chains. To explore this in greater extent, we propose a decision knowledge sharing (DKS) framework based on decision and knowledge sharing in dynamic flexible supply chain environment. By exploiting DKS and flexibility in supply chain structures,
better operational performance can be achieved. Considerable research efforts have been devoted to development of decision knowledge sharing framework in flexible supply chains (FSCs) environment, especially at operation levels, wherein decisions and knowledge delays have implicitly been assumed to be significant. Thus, there is need to model significant knowledge sharing delays in the decision process at the critical decision stages.

In this paper, we focus on the knowledge, knowledge sharing, and decisions to study the impact of the decision flexibility, DKS and delays on the performance of the flexible supply chains. It is important because of relationship between control decisions and availability of knowledge in any DKS based FSCs. There is further a need to evolve a judicious use of decision flexibility at selected chain stages. Thus, a careful analysis of the chain with a focus on integrated decision is useful to ensure success. This paper presents this endeavor and highlights the key insights.


Negotiation is a means for a group of decision-making agents to reach mutually beneficial agreement through exchange of strategic information. But, the decision makers are often reluctant to share their private information with others. The primary contribution of this thesis is to study various scenarios of multi-party negotiation in the areas of supply chain management, e-markets and auctions in order to suggest appropriate privacy models for these problems and finally to develop privacy-preserving coordination mechanisms and/or protocols for these situations by applying the concept of secure multi-party computation to the underlying problem, which is more often than not an optimization problem in a distributed setting where parties are connected over
an insecure medium such as internet. Specifically, four problems have been tackled in the thesis:

✓ Collaborative supply chain planning
✓ Discriminatory price negotiation in an e-market
✓ Combinatorial reverse auction and 1-n-p negotiation protocol
✓ Multi-objective group decision making and group buying.


The colour of the car is the most important attribute at the point of sale. The paper focuses on problems with automotive coating suppliers in India. In spite of the robust growth of the auto sector at more than 12% average in last four years and inflow of almost all leading global firms, the automotive coating industry seems to be lagging in basic strategic requirements.

➢ Resources: There are only two major and two small capacity players who could be approached as vendors. The production capacity, raw material procurement and R&D competencies are nowhere close to global standards. With different technologies prevalent in other parts of the world, the service and technological know-how in automotive coating is lagging behind.

➢ Capabilities: With the colour life cycle of automobiles being as short as six months, the colour suppliers must be equipped with new colour variants. Time to market needs to be faster.

With the absence of global standards and compatible technologies in this technologically intensive sector, it becomes increasingly difficult for the companies to ensure customer satisfaction and survival in healthy business
relationship. This paper suggests immediate steps to handle the crisis situation in the automotive coating sector and provides clues from global supply chain initiatives of global players for long term sustainability of the business. Strategic alliances between the major and minor players across the industry could lead to demand fulfilment. This will provide synergies in coupling competencies across the value chain for most of the suppliers. Such an alliance will fulfil just-in-time and Kanban requirements of Japanese suppliers. Since it is a medium to low clock speed industry, technological front strategic alliances will last longer.

The alliances can evolve further to joint ventures and takeovers which will combine the competencies of different organisations across the value chain. A one stop shop for automobile marketing executives could be an added attribute which can be associated with this industry.


Supply Chain Management (SCM) is the key to success in today’s competitive global environment for any business organisation. The objective of this paper is to understand the inland Logistics and SCM of TCL Consumer Electronics Pvt Ltd, within India. TCL India Holdings Pvt Ltd is a subsidiary owned by TTE, which has been operating in India for the past ten years. The company was started in China and spread across the globe with a strong logistics control. Other than exploring implementation of the Logistics and SCM of TCL Consumer Electronics, this paper explores the current market channels of distribution of goods from the supplier’s supplier to the customer’s customer and focuses on the TV segment. This paper is exploratory and descriptive in nature.

Variability induces disturbances across the supply chain and reduces the performance of the supply chain in terms of high inventory, wasted capacity and/or reduced customer service. Research has benchmarked business processes in detail for several years, finding a clear correlation between leadership in the use of demand-driven principles and tools and higher financial metrics.

Lean manufacturing being a demand driven approach uses techniques such as demand smoothing/production levelling and material pull. Levelling smoothens the system and reduces the bull-whip effect, whereas the material-pull allows to produce as per the customer demands. It thus creates a value stream precisely from the perspective of the end customer and eliminates waste.

SAP LPO the latest offering from SAP on Lean Manufacturing, built on Toyota Production System—is a user friendly application—with powerful ‘what-if-planning’ and exceptional management capabilities. One of the key functionalities of the SAP LPO is the pacemaker operation. It sets up the rhythm of the factory which creates levelled production schedule for the plant using sophisticated algorithms. SAP LPO solution ensures that there is no unnecessary inventory buildup or shortages created. Spikes in demand or upstream material shortages are planned early without sacrificing customer delivery commitments. It provides Heijunka levelling which levels the demand based on capacity and mix to maintain optimum EPEI (every part every interval/period).

The supermarket component of SAP LPO makes recommendations on the number of kanbans for each item, and provides real time visibility to the kanban
levels based on changes in demand and execution. SAP LPO can also help in solving some of the problems faced by manufacturing companies with their Lean initiatives. Lean initiatives often fail due to the lack of support to manage a portfolio of products in a systematic way and sustaining such methodologies across the enterprise. Other challenges to Lean include manual Kanban with printed cards, which while working well within contained environments encounter major difficulties when extended across plants and suppliers. With SAP LPO, the above issues can be eliminated and Lean initiatives can extend and scale across the supply chain.


The traditional supplier-customer relationships within a supply-chain have undergone radical changes in recent years. Similarly information sharing has been proposed as one of the possible solutions to reduce the bullwhip effect, i.e. the increase in demand variability as one move up the supply chain and its impact on the supply-chain performance in terms of total costs, inventory levels, customer service levels, etc. Collaboration in a supply-chain allows information sharing of important sales data between trading partners within the supply-chain, and incorporates collaborative handling of inventories, promotions, orders shipments etc.

With the advent of Internet, the costs associated for sharing of supply-chain information between members have reduced drastically. We seek to develop inventory policies to investigate the impact of sharing information on supply-chain performance in terms of total costs, inventory levels, customer service levels etc.
We propose to consider multiple-retailers, one-distributor setting, where stationary/ non-stationary consumer demand is faced by the retailers and different levels of collaboration exists between retailers and the distributor in terms of the extent of information shared. The amount and nature of information shared increases as the level of collaboration increases.

Our research would evaluate the optimality of the inventory policy for different collaboration levels and identify the trade-offs between inventories, service levels and information. We would measure the impact of collaboration in terms of performance-oriented measures related to supply chain costs, inventory levels, customer service levels and also in terms of reduction of the bullwhip effect and its impact. An information technology (IT) strategy would be formulated on the role of IT in enabling collaboration between supply-chain partners and the IT implementation issues with respect to adoption of various collaborative programs.


This paper describes a stream of physical activities, involving multiple modes of transport and handling, and multiple actors – in the context of supply chain management. Part 1 is a general introduction to the area of multimodal transport and containerised movement of goods. Part 2 provides an analysis of one particular channel through which containerised movements through rail and road move through one of the major ports in India.

The main focus is to map the flows of material, information, finance and transactions in this supply chain and see how the management of these flows fit in with supply chain objectives. This has implications on the planning and use of IT for this purpose and the way the actors involved in this chain organise
themselves. This is elaborated for two of the major actors in this: Container Corporation of India (Concor) and Indian Railways (IR).


Numerous models, algorithms, and tools have been deployed in supply chain modeling and decision making. These are based on stochastic models, optimization models, object oriented models, and simulation. This paper provides an expository introduction to decisions, performance measures, mathematical models, and software models in supply chain networks.


Advanced supply chains are equally well planned at all three levels – strategic, tactical and operational. Large capital intensive Chemical & Petroleum industries have traditionally been leaders in institutionalizing strategic planning that optimized their Net Present Value (NPV). Yet, like many other industries, at tactical and operational levels, they continue to be driven by cost minimization of independent sub-processes.

This paper highlights the improvement opportunities in real world tactical and operational planning, especially when such planning is automated through modern Advanced Planning and Scheduling (APS) systems that employ sophisticated quantitative tools. Alternate approaches are necessary when packaged APS systems do not fit the details of a planning process. The progression to holistic or enterprise-wide planning, which can provide additional benefits has also been indicated. The difference between cost minimized and profit maximized planning are next illustrated through typical examples from two stages of the Supply Chain. Recent Market Surveys have
identified the most critical and widely adopted Supply Chain Technologies. This paper identifies which of these planning processes could be given an integrated profit orientation. Finally, it is pointed out that when dealing with the Customer-Chain, profit metrics become essential elements of Supply Chain Operating Reference templates. As every business has to be market facing, this profit theme will permeate through all planning phases.

Apart from these details of national and international literature survey researcher has also referred details of conferences held in so many years and few of them are mentioned below:

1) **A study of the global supply chain with specific reference to the automotive industry**, K Kanthakrishnan, R Muruganandham, R Maheshwar, A Vijay Alagappan, R G Prasanna Kumar & R Hari Krishnan, Thiagarajar College of Engineering, Madurai.

2) **Innovations in fresh vegetables supply chain—risk reduction as driver of innovations**, M G Subramaniam,D N Suresh, Janat Shah & Uma Kaushik, IIM Bangalore.

3) **Supply chain risk management – a chain is only as strong as its weakest link**, Tobby Simon, Synergia Foundation.


5) **Understanding supply risk in supply chain—a fuzzy framework**, Kunal K Ganguly & Kalyan K Guin, KIIT School of Management, Bhubaneswar.

6) **Identification of improvement opportunities in the application of information technology for managing global supply chains—an emerging economics**
perspective, A K Damodaram & K Ravindranath, Sree Vidyanikethan Engineering College, Chittoor.


8) Role of standardisation and integration in building supply chain integration capability, Ravi Seethamraju, University of Sydney, Australia.


10) The impact of supplier relations on the supply chain performance metrics—a study on the automobile industry in south India, Pushpa Bhatt, V E Mohan & Bhavani H, Bangalore University, Bangalore.

Reference: Conference proceedings on Global Supply Chain Management: Role of Emerging Economies organized by IIMB Management Review (IMR), the Supply Chain Management Centre, IIMB (SCMC) and the EADS-SMI Chair for Sourcing and Supply, IIMB, December 22–24, 2008.


12) Supply chain reconsideration- to suit global and local environment, M.D. Apte, Member Indian Concrete Institute.

13) Supply chain management in the Indian steel industry, J.S. Charlu, Director Jindal Vijayanagar Steel Limited.
14) **Best practices in Supply Chain Management at Modi Xerox**, Vibhash Joshi (Logistics and Supply Chain at Modi Xerox ltd) & S.K. Chopra (Equipment Management Group).

15) **Customer focus in Supply Chain Management**, Anoop Khandelwal (Hewlett-Packard India Ltd.) & Sanjay Nigam (Finland post Limited).

16) **Demand management in supply chain**, Prasant Yadav & P.A.V. Sridhar, KLG Systel.

17) **Supply Chain Management-real vendor cost management**, Sunil Kulwal, Vikram Ispat.


19) **Road transportation in India: the untrapped source of profit for business enterprises**, N. Kathuria, ABC Business Solutions Pvt. Ltd.


21) **Application of knowledge management for effective supply management in a dynamic business environment**, Babu Lal (BHEL), Prem Vrat (IIT Delhi) & sushil (IIT Delhi).

22) **Enhancing customer relationships through effective supply chain-putting the act together**, G. Shainesh, MDI Delhi.

Reference: Conference proceedings on Supply Chain Management for Global Competitiveness in India organized by Management Development Institute, Gurgaon, November 20–21, 1998.
After going through vast literature available on internet, libraries, conference proceedings & theses it is cleared that none of the topics referred so far, has covered the issue of management of supply chain in small scale manufacturing units. Thus researcher has selected this novel topic for his research.

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