Chapter 2

LITERATURE REVIEW:

2.1 Supply Chain Management, Processes and Managerial Competencies

Croxton, et al. (2001) have discussed on The Supply Chain Management Processes. Authors in this paper have provided managers with a framework to be used in implementing supply chain management whilst researchers may use the same framework as a set of opportunities for further development of the field. Supply chain management is simply defined as the management of key business processes across the network of organizations that comprise the supply chain. While many have recognized the benefits of a process approach to managing the business and the supply chain, most are still unclear about what processes are to be considered, what sub-processes and activities are contained in each process, and how the processes interact with each other amidst the traditional functional silos. Authors have explained strategic and operational descriptions of each of the eight supply chain processes as per The Global Supply Chain Forum and provided illustrations of the interfaces among these processes.

Alain and Martin (2009) have studied on Mastery of operational competencies in the context of supply chain management. They found that competitiveness of firms is linked to the development of competencies. Core competencies stem from better mastery of organizational abilities than its competitors as valued by customers. This paper attempts to find how a more sound integration of the supply chain may be linked with greater mastery of operational competencies. The statistical analysis categorized respondents into four clusters with regard to their supply chain management practices. The study also identified four operational competencies i.e. delivery, cost, logistic services, and design. It was observed that those with highly integrated supply practices mastered an operational competency in logistic services.

Moon, et al. (2005) have discussed on Systems thinking ability for supply chain management. In this study, authors have made an attempt to explore how individual systems thinking ability impacts on the supply chain. The authors used a range of
different research methods including surveys, tests, and simulations. The results showed that individual systems thinking ability greatly influences the practice of supply chain management. The authors suggest that the rationality of managers in the decision-making process is good for the supply chain efficiency; inventory and production managers need to make decisions with the systems’ thinking ability and the consistency even in on-line inventory systems.

2.2 Architecture and Competitiveness of Supply Chain: Indian Experience

Sahay, et al. (2006) have studied on Managing supply chains for competitiveness: the Indian scenario. Authors in this paper have explored Indian organizations for their current level of supply chain management practices. Authors have outlined a framework of achieving competitiveness by alignment of supply chain strategy with business strategy giving due coverage to three dimensions namely objectives, processes and management focus. They have found that most of the Indian organizations have aligned their supply chain objectives with their business objectives and are now on course of aligning their supply chain processes with management tools and lastly align their supply chain focus areas with their management focus. Authors have not assessed the current level of supply chain processes, but have opined that Indian organizations need to establish specific performance measures for continuous improvement of supply chain efficiency to maintain their competitiveness in a globalized economy.

Sahay, et al. (2003) have studied on The ‘Indian’ Supply Chain Architecture. The author(s) have studied different aspects of practice of supply chain management in Indian industry. In the current article, authors have explored what ails Indian industry in terms of supply chain efficiency and effectiveness as is evident from the fact that nearly 22% of industry sales are tied up as inventory. Authors have raised pertinent questions as to whether it is due to the way in which it is configured – their orientation to processes to streamline business, their fusion of information technology to speed up business transactions, their strategy to approach SCM strategy to improve bottom line. The article throws up glaring facts of architecture of supply chain in India. Authors conclude that while some businesses are moving fast, but many others are still
struggling to realize their best opportunity of impacting their bottom line business performance.

Samaranayake (2005) has studied on Managing supply chains for competitiveness: the Indian scenario. This paper presented research work done by him to develop an integrated framework and a methodology for planning of components in the supply chain such as resources, warehouses, materials, activities, suppliers and customers. The framework proposed was of unitary structuring technique where bills of warehouses, bills of materials, project networks and operations routings, in both manufacturing and distribution networks are merged into a single structure. The planning approach and framework developed in this research were new and capable of providing flexibility, visibility and maintainability for improvement in the supply chain environment.

Kotzab, Herbert et.al. (2011), developed a conceptual model that includes drivers of supply chain management (SCM) adoption and execution (internal conditions, joint or external conditions, and the adoption of SCM-related processes), and provide a set of measurement scales that operationalize constructs within this model, empirically verifying a hierarchical order of antecedents. Authors tested the conceptual model through a survey of 174 senior SC managers and verified proposed antecedents: “internal SCM conditions”, affect “joint or external SCM conditions”, which in turn influence collaborative “SCM-related processes”. The findings assist management by providing a focus on those SCM conditions and processes that need to be prioritised to improve successful SCM adoption and execution. However, survey results reflect the views of large organisations in a country-specific supply chain setting, which cannot be generalised worldwide.

2.3 SCM Strategy: Integration and Implementation Issues, Success Factors

Power (2005) has studied on Supply chain management integration and implementation: a literature review. The author has reviewed a cross-section of literature to highlight the inter-dependence between integration (technologies, logistics, and partnerships), a strategic view of supply chain systems, and implementation
approach. First, supply chain integration covers issues relating to integration of core processes across organizational boundaries through improved communication, partnerships, alliances and cooperation. Second, strategy and planning examines supply chain management as a strategic matter for trading partners. Third, implementation issues concern factors critical for successful implementation as well as issues specific to inter and intra-organizational aspects of supply chain initiatives. Author further argues that while these perspectives require a holistic and systemic view of the supply chain, but such a view acts as an impediment to more extensive implementation. The strategic nature of adopting a supply chain wide perspective on the one hand, provides significant potential benefit and on the other, requires trading partners to think and act strategically. However this is easier said than done.

Sridharan, et al. (2005) have evaluated on Implementation of supply chain management and its impact on the value of firms. This paper outlined the case study of shoe manufacturers Hershey and Nike and the impact supply chain implementation issues had on these firms’ value. It is interesting to learn how supply chain management software aimed to maximize firm value actually caused supply chain disruptions and losses for the firm; thereby creating a decline in firm’s value and disappointment for the firm’s stakeholders. Authors have suggested that a great care should be taken when implementing new SCM software solutions. A careful and proper assessment of difficulties in implementation arising from complex SCM systems to track multiplicity of product varieties as well as adequate testing should be attempted to confirm that the new system would meet firm’s requirements. Premature switching to new software can create blunders and have disastrous consequences.

Kim (2006) has studied Effects of supply chain management practices, integration and competition capability on performance. The objective of the author in conducting this research was to check and establish causal relationships among supply chain management (SCM) practice, capability, the level of integration within supply chain, competition versus firm’s performance. The research was helpful in developing a set of recommended strategies of SCM practices for Supply Chain integration and a framework for linking a firm’s Supply Chain integration strategy to its competitive
strategy, and in understanding how such a linkage can be exploited to the improvement of organizational performance. It was inferred that during early stage of organization development, the emphasis on systemic SC integration would be more crucial. Once SC integration has been implemented, it may be advisable to focus on SCM practice and competition capability.

Rao, et al. (2006) have examined on Assessing supply chain management success factors -- a case study. Authors have examined here key operational issues related to strategic success factors while implementing SCM plans in an organization. The most important objectives to implement SCM strategies included cost reduction, improving inventory, lead times and customer satisfaction, increasing flexibility and cross-functional communication, and remaining competitive. The responses by the survey respondents revealed that enough resources were not allocated to implement and support SCM initiatives in their divisions. In addition, most respondents perceived that better resource allocation are needed in the areas of better information systems, greater commitment, setting clear-cut goals, increased training, and aligning SCM initiatives with current priorities and resource commitments.

Pamela Danese and Pietro Romano (2011), investigated the impact of customer integration on efficiency performance and the moderating role of supplier integration. Through a survey of 200 manufacturing units, authors highlighted the need for firms to simultaneously pursue integration with customers and suppliers to improve efficiency performance. The authors also claimed that CI alone is not enough to guarantee cost reductions; and if SI is low, CI can even make efficiency worse. Schedule nervousness is a typical effect linked to customer integration that can be efficaciously faced through the integration of suppliers. However, information collected from surveys were on the level of integration of focal firm with its immediate suppliers and customers, SC integration involves second/third tier customers/suppliers also, thereby limiting the outcomes of the research.

Diaz B.A., et.al. (2012) identified and evaluated the impact of various factors that affects the reliability of complex supply networks. Through variance analysis and linear regression models, authors found that network density, node criticality and complexity
were most significant factors among all in reducing the reliability of supply networks. Node complexity (i.e. the total number of nodes in the network) had the strongest negative impact on network reliability, whereas the sources criticality (i.e. the level of redundancy of suppliers) had strongest positive impact. Article serves as a guide for designing of more reliable supply networks and helps to prioritize actions that focus on factors with a stronger impact on reliability.

Andrew Fearne, Marian Garcia Martinez and Benjamin (2012), the authors have talked about the importance of Value chain Analysis (VCA), through case studies, in terms of its contribution in exposing strategic and operational misalignment, the consequential misallocation of resources, which is return create value and economic sustainability. However the argument is presented to broaden the boundaries of VCA and proposed three dimensions to illustrate flaws in the tool: boundary of analysis, scope of value considered, Governance. The study suggests that inadequate attention is paid to social and environment consequences which ignore the competitive advantage of improved environmental management and social welfare.

Measures for auditing performance and integration in closed-loop supply chains Mondragon et al. (2011) through this paper proposed measures to audit the supply chain with both forward and backward movement (return) of product at the same time and validated the utility of same in enhancing SC performance through a case study of network operators. The authors based the measures on performance evaluation in a closed-loop Supply Chain, reverse logistics and SC integration highlighting the importance of ICT (Information & Communication Technology). The paper brings out the importance of reverse supply chain for industries with products having short life and effectively evaluates the health of a supply chain and its performance identifying the need of inventory control and its impact on accuracy of forecasting. Though its applicability on supply chains for durable products (long life) cannot be established.

Baofeng Huo (2012) has presented study, using data from 617 companies in China, which intends to develop and test a conceptual framework of supply Chain Integration and company performance by formulating two questions: What are the sub-dimensions
of SCI and what are the relationships among them; how do different types of SCI simultaneously influence different types of company performance? The study used structural equation modelling method to examine the impact of three types of supply chain integration (Supplier integration, customer integration, internal integration) on three types of company performance (supplier-oriented performance, customer oriented performance, financial performance) from the perspective of organizational capability.

2.4 Supply Chain Management or Logistics

Cooper, et al. (1997) have examined on Supply Chain Management: More Than a New Name for Logistics. Authors in this paper have argued that the supply chain management has been conceptualised by Educators and Practitioners as an extension of Logistics, the same as Logistics, or as an all-encompassing approach to business integration, is a too narrow view for a subject like supply chain management. Authors have opined that there is a need for some level of coordination of activities and processes within and between organizations in the supply chain that extends beyond the boundaries of logistics as normally understood by academics and industry. The authors have proposed a conceptual model to guide future research and decision-making in the field of supply chain.

Kenneth, et al. (2008) have studied on the impact of logistics performance on organizational performance in a supply chain context. Authors in this paper have attempted to make theory for examining a logistics performance model incorporating logistics performance as the central key construct with supply chain management strategy as antecedent and organizational performance, both financial and marketing, as consequences. The research results indicated that logistics performance is positively impacted by supply chain management strategy which in turn positively impacted marketing and financial performance.

Gubi (2003) has examined Doctoral dissertations in logistics and supply chain management-A review of Scandinavian contributions from 1990 to 2001. In Scandinavia during the 1990s, steadily increasing interest was observed in research in logistics and
SCM through Ph.D. students enrolled in the Scandinavian research environments as well as by the participation in the annual NOFOMA Nordic Logistics Conference. The proposed framework classifies the dissertations into a number of main themes indicative of the extent and state of research in logistics and SCM.

Liu Wei-hua, et.al. (2011) through a numerical model analysed emergency order allocation mechanism and the relationship between the emergency coefficient, uncertainty and emergency cost in two-echelon logistics service supply chain. Authors found that with the increase in uncertainty, total cost of logistics service integrator (LSI) increased, while the general satisfaction of all functional logistics service providers (FLSPs) decreased and so does the reliability of logistics capacity of all FLSPs. Authors also concluded that greater of emergency cost coefficient brings more satisfaction in FLSPs, but the reliability of logistics capacity first rises then drops later. The research suggests how LSIs under emergency conditions, can manage their FLSPs to achieve higher logistics performance. However, adoption of only a group of data in emergency cost coefficient and unsolved multi-objective emergency order allocation model algorithm, remain as limitations of the research.

4th Party Logistics

Hingley et al. (2011) through this paper explored the possibilities, barriers and benefits in adopting horizontal collaboration through 4th Party Logistics management with the help of semi-structured interviews of suppliers, logistics service providers (LSPs) and grocery. The paper highlighted the acceptability of LSPs and Suppliers towards 4PL innovations as well as the discomfort prevalent among retailers who preferred controlling supply chain despite the tremendous scope of cost reduction, optimization of asset utilization, improvement in customer service and efficiency offered by the collaborative approach through 4PL. The authors through its proposed typology emphasized on the importance of expertise in asset utilization, technology and information management to ensure high performance of 4PL management as the intensity of collaboration and complexity of distribution increases. The paper provides a good insight of attitude of companies towards 4PL but the findings were limited due to lack of participation hence the outcomes cannot be generalized.
2.5 SCM Performance Management and Measurement:

Wickramatillake, et al. (2007) have studied on measuring performance within the supply chain of a large scale project. Author has targeted this paper for senior and middle managers involved in large cost reimbursable projects with the purpose to explore the performance measurement methodology adopted by a company while executing the euro 6.0 billion London Heathrow Airport Terminal 5 construction project. This research was not about testing a theory; it was about getting insight relating to supply chain performance measurement of a large-scale project in the actual functioning of following eight key areas of concerns: performance measurement requirements; lack of detailed planning; non-ownership of forecasting and progress reporting by suppliers; organizational structure; right performance measurement tool; absence of detailed work breakdown structure causing unnecessary complications to performance analysis; data capture; timing of progress and cost capture affecting the analysis; and scope change and traceability.

Fawcett, et al. (2007) have examined on Information Sharing and Supply Chain Performance: the role of connectivity and willingness. This paper explained how information technology (IT) was used to enhance supply chain performance. A large-scale survey and semi-structured interviews were used to collect industry data along two distinct dimensions to information sharing – connectivity and willingness and analyzed. Whilst both dimensions were found to impact operational performance, many companies have focused only on connectivity, often overlooking the willingness construct. The outcome was as expected, information sharing seldom delivers on its promise to enable the creation of the cohesive supply chain team. The research presented a two-by-two matrix to help managers and academics understand the related nature of connectivity and willingness. The paper also presented a roadmap to help guide IT development and investment decisions.

Towill (1996) has studied on Time Compression and Supply Chain Management- A guided tour. Author says that supply chains were expected to respond rapidly, effectively and efficiently to the changes taking place in the marketplace. At the same time there was a drive to achieve world-class customer service level while maintaining
minimum reasonable inventory (MRI). This leads to the classic conflict of interests between marketing, production and materials management. Marketing desires the whole product range available off-the-shelf; production wants to manufacture in economic batch quantities to achieve economies of scale; and materials management is trying to minimize storage and distribution costs which, in turn, requires that a total systems MRI policy be adopted. Time compression at all stages in the chain is considered the best way to respond to these challenges. It was confirmed through this paper, on the basis of industrial studies, that collapsing cycle times drive the business into a more competitive scenario.

Ellinger Alexander, et.al. (2012), addressed the lack of metrics for quantifying the effects of SCM on firm performance by evaluating two important firm-performance metrics - customer satisfaction and shareholder value. Using data from secondary sources, authors found that the firms recognized by experts for superior SCM competency exhibit higher levels of customer satisfaction and shareholder value than others. However, more evidence was required to prove this proposition and more number of top performer firms should be available for analysis. Nevertheless, the strong correlations found between SCM competency and firm performance metrics also help managers to better appreciate the strategic, operational and financial advantages of developing SCM competency.

Lambert D.M. and Schwieterman M.A. (2012), viewed supplier relationship management (SRM) as strategic, process-oriented, cross-functional, and value-creating tool for buyers and sellers. Focus group sessions were held with industry executives to identify most advanced SRM practices at the strategic and operational levels. With research data from these sessions in hand, authors prepared a macro level cross-functional framework of SRM for managing business-to-business relationships to co-create value and increase shareholder value.

Chavez Roberto, et.al. (2012) through a survey of manufacturing companies suggested that a non-monotonous relationship exists between supply chain management (SCM) practices and SCM performance across carrying levels of industry clock speed. Authors also provided a theoretical description of the contingency factors in the SCM by showing
that industry clock speed affects the way SCM practices impact on SCM performance. However, data collected from single key informants (causing common-method bias) and the less number of SCM practices proposed to be tested, limits the scope the research.

Kwak Hung Lau (2012) has expressed his views on the importance of efficiency and responsiveness in supply chain and also expressed concerned about both being inversely proportional to each other. An effort to increase the efficiency of the system in terms of cost, less inventory, one has to sacrifice on the speed of the process and hence responsiveness is compromised. However to increase the responsiveness of the system, inventory is maintained on the cost of efficiency. Case study has been presented to establish that appropriate demand management can provide overall distribution efficiency, parallel to required responsiveness.

Roy Stratton (2012) has documented the usage of construct’s literature, variation, uncertainty, performance trade-offs and buffering for decades. Author, however, expresses the evidence of gap between these constructs to distinct strategies. Author thus, has presented a case study using inductive analysis of a transition in the level of stability, focusing on trade-off performance with association of changes in choice and buffering mechanism. The study explained cause and effect logic and mapped using constructs, same has been used to offer enhancements to Fisher supply chain strategy model in generalizing guidance.

Cambra-Fiero et al. (2011) through this case study emphasized the ‘think global, act local’ strategy in adapting Supply chain in international scenario. The Authors identifies both the similarities and differences in Carrefours' supply chain practices in Spain and China focusing on various aspects of SC such as customer service, chain integration, production and operations, distribution and storage, technology and information, reverse logistics and strategic alliances. The case study highlights the importance of understanding the consumer behavior and cultural aspects and molding supply chain as per local characteristics to ensure the acceptance in market. This paper also provides a good insight of FMCG supply chain practices in Chinese and European market.
Childerhouse et al. (2011) through this paper proposes Quick Scan Audit Methodology as a tool for accurately indicating the health and performance of a Supply Chain. In this paper the authors identify reductionism as the major inhibitor in development of a universal SCM theory by researchers and emphasize on broader system perspective for a developing a feasible management theory. The paper showcases QSAM as the tool which overcomes the weaknesses of previous studies, identifying key success factors for successful audit. It also highlights the continuous evolution of QSAM for over 12 years into becoming a refined standardized research methodology, also indicating further scope of refinement.

Frank Lambrechts et.al. (2012) have presented the paper to build a conceptual framework, using “synthesizing” of “bricolage” approach over a variety of literature (strategic management, multi-party collaboration, supply chain management, organizational change and learning), for understanding how-in-depth joint supply chain learning can be successfully developed. The authors have suggested that outcome of actor’s orientations, competencies and behavior play enhances System-level generative outcomes, i.e. quality improvements, greater market share, a faster “time to market”, product innovations, increased flexibility, strategy development on the level of the supply chain, also shaping the relationship between supply chain actors and in-depth learning.

2.6 Technology in SCM: Is there a choice? Is it the pill to remove all ills?

Gulledge and Chavusholu (2007) have studied on automating the construction of supply chain key performance indicators. Authors in this paper aimed to automate the supply chain operations reference (SCOR) model to facilitate process-oriented business intelligence of supply chain. The hypothesis was: SCOR model automation is possible using data that is directly extracted from integrated enterprise systems. To test the hypothesis, an alignment program that allows the SCOR model to be automated with information that is directly extracted from the Oracle E-Business Suite was developed. It was found that in order to achieve the full benefits from the SCOR model, effective business process management and the SCOR key performance indicators (KPIs) have to be implemented first. Unless data collection to support KPI construction is automated,
it is difficult to institutionalize the SCOR model as a measurement and benchmarking framework.

Evangelista and Sweeney (2006) have studied on Technology usage in the supply chain: the case of small 3PLs. Authors in this paper opined that a successful supply chain management strategy evolves from the performance of third party logistics (3PLs) providers as they play a key integrative role effectively linking the different elements of supply chain. Information and communications technology (ICT) has become an important element of 3PL competitive capability as it facilitates higher levels of supply chain integration. This is critically important, particularly for those markets populated by a large number of small 3PLs such as the Italian logistics industry. The empirical investigation examined a sample of 153 small Italian 3PLs on the base of a definition and taxonomy proposed by the authors.

Lin (2007) has studied on Factors affecting innovation in logistics technologies for logistics service providers in China. With the fast growth in China’s economy and China’s accession into WTO, the demand for logistics services has been growing significantly in China. Author stated the purpose of this research is to study the factors affecting the innovation in logistics technologies for logistics service providers in China. Logistics technologies are classified into four types: data acquisition technologies, information technologies, transportation technologies and warehousing technologies. The influencing factors were internal and external factors. Regression analysis was used to analyze the influences of these factors on technological innovation. The innovation in logistics technologies is significantly positively influenced by organizational encouragement, environmental uncertainty, quality of human resources, and governmental support for logistics service providers in China.

See (2007) has studied on Wireless technologies for logistic distribution process. Author’s purpose of this paper is to present the integration of logistic management with information and communication technologies to largely improve the effectiveness of logistic fleet operations. The step-by-step methodology included first, the application of information and mobile communication technologies in providing effective logistic distribution service is introduced. Then, the proposed real-time fleet management
system (RTFMS) architecture is depicted, the technology profiles for mobile data terminal (MDT) and logistic information system are described, and the considerations of various wireless mobile communication technologies for logistic distribution process are also addressed.

Karkkainen, et al. (2004) have studied on Efficient tracking for short-term multi-company networks. Authors have expressed that tracking of shipments is an important element of customer service in the transportation industry; and essential for logistics services as merge-in-transit. However, contemporary tracking systems are designed for use within a single company, and are invariably inadequate for multi-company environments due to proprietary tracking codes and information architectures centered on the tracking service provider. This paper presents a novel forwarder-independent approach for solving the difficulties of tracking in multi-company supply networks. The research argued that the proposed tracking approach is superior to contemporary approaches for material flow tracking in short-term multi-company distribution networks.

Stefansson et.al. (2009) have studied on the importance of flow of data / information with the help of suitable technology for improvement of efficiency of Logistics Setups. They elaborated the point through a conceptual framework of Smart Transportation Management system which identifies Smart Freight (enables auto detection and flow information along with cargo), Smart Vehicle (enables vehicle, goods and information management) and Smart infrastructure (enables interacting physical infrastructure through digital infrastructure) as the pillars. These components embrace some factors that have effects on supply chain performance; however to different extents. The paper shows that high cost of implementation of technology can be offset by savings due to improved efficiency, lower Turn-Around time, faster and reliable delivery. However it doesn’t explore the constraints of other aspect of Supply chain and its impact on supply chain as a whole.

Perry (1996) has interestingly titled his article Look before you leap in which he shared that Automating warehouse operations can be a very alluring proposition. However, it is vital that a decision to progress with such substantial investment is taken only after the deliverable benefits are thoroughly understood. The author in this paper describes the
approach taken by a company B&Q to decide on the appropriate level of automation; explains how, through a process of establishing good performance through manual processes, it has created a sound base against which it can evaluate automation, and how its new supply chain strategy has exposed further opportunities to improve business performance. Also describes how B&Q Distribution has renewed its focus on serving the customer and how this experience has affected the automation project. Supplier selection approach of B&Q was also shared. The process recipe of automating a warehouse: Know the customer requirements, Know the business requirements, Spend enough but not too much time working out where you are now, be very clear of where you are not fulfilling requirements currently (gaps), test automation against the “gaps”, not what you can already do, and finally automate the opportunity.

Favilla and Fearne (2005) have examined on Supply chain software implementations: getting it right. Authors in this paper have shared key insights for successful implementation of supply chain projects with a significant IT component. According to authors, successful supply chain projects have four things in common, the right leadership, the right focus, the right approach and effective communication of KPIs to all stakeholders engaged in the project. The authors warn that companies must not assume that investment in IT is, by itself, a solution to their supply chain problems. A lack of leadership, focus and communication will invariably result in sub-optimal solutions or results which are frequently understood wrongly by attributing them to either complex nature of project or the inflexibility of the software, whereas in most cases the problems are internal to the businesses involved and project management process per se. The paper gives practical tips for improving the likelihood of getting the most out of IT-based supply chain projects.

Towers, et al. (2008) have studied on a composite framework of supply chain management and enterprise resource planning (ERP) for small and medium-sized manufacturing enterprises. This paper seeks to examine the factors which influence the ability of SMEs to align their enterprise-planning systems with the requirements and constraints of supply chain relationships in order to meet their strategic and operational requirements. The paper develops a composite framework of enterprise planning and
supply chain management which allows manufacturing SMEs to understand how these interact and can be aligned. Strategic and operational requirements of a manufacturing SME may be an area where those supplying products upstream have an advantage over their bigger manufacturing base. For a manufacturing SME, these issues and mechanisms will be the responsibility of only a few people whose interactions are likely to focus on short-term issues, but they can begin to move their perspective from day-to-day pressures and take a more holistic, long-term view of the business. By so doing, they can achieve a more effective alignment of external and internal requirements and mechanisms which will benefit themselves, their customers and the entire supply chain.

Forslund (2009) has examined on ERP systems’ capabilities for supply chain performance management. The author in this paper has explained conceptually by a literature review, a framework for the demands from supply chain performance management (PM) on enterprise resource planning (ERP) systems and evaluated the corresponding capabilities of common ERP systems using empirical study based on interviews of respondents for 12 common ERP systems available in Swedish market. The findings give two types of input to companies purchasing or upgrading ERP systems; a “checklist” of demands from supply chain PM and an evaluation of the corresponding capabilities for common ERP systems. The findings imply that future research on supply chain PM could focus less on ERP systems’ capabilities and more on how ERP systems are applied.

Chandra and Kumar (2000) have authored this paper on an application of a system analysis methodology to manage logistics in a textile supply chain. Authors in this paper have expressed that synchronization of various activities throughout the life cycle of its products is one of the common problem in managing a supply chain and have explained through a case study of US garment industry how QR (quick response) initiative in supply chain is built through AR (Accurate Response). “AR is an approach to forecasting, planning and production that builds on QR capabilities within the supply chain organization. AR seeks to improve supply chain performance sufficiently that manufacturers can postpone decisions regarding unpredictable products until forecasts can be validated with their point-of-sale data”. This is enabled by the information
technology that leverages utilizing of production and logistics technology to manufacture and deliver products efficiently.

Sarkis, et al. (2004) have studied on E-logistics and Natural Environment. In this paper, authors have attempted to discuss a seldom studied subject i.e. growing arena of e-logistics and its impact on environment. The e-logistics models and practices include forward and reverse logistics functions of organizations. All areas of these functions (e.g. inventory management, transportation, warehousing, delivery management, supplier management, packaging and order management) having a profound impact on our environment, positive and negative as the case may be. Whilst discussion is quite preliminary in nature, but evokes interest in the reader’s mind to warn him of negative environmental concerns and provokes readers to be aware and conscious of reducing negative effects.

2.7 SCM: Importance of Information Sharing

Li, et al (2006) have studied on Enhancing agility by timely sharing of supply information. Authors have rightly pointed out in this article that while enough attention has been paid to demand information sharing in the recent times, few studies look at the value of supply information sharing. Authors’ purpose of this paper is to address the importance of timely supply information sharing to the supply chain management under disruption. By introducing a Directed Acyclic Supply Network (DASN) model, an Impact Network (INet), comprehensive algorithm is developed to calculate the time and cost impact of the disruption. Finally, above model has been applied in a manufacturing firm in China. Its performance is then compared in the case of timely supply information sharing with cases where information is not shared or is shared late. Authors have shared the insight that by timely sharing of supply information, firms at downstream stages can alert a disruption at an upstream stage, derive the correct early warning time, and make proper decisions to offset the impact of the disruption. Information sharing therefore enhances the agility of firms while improving the stability and performance of the whole supply chain.
Popovic, et al. (2012) have studied on exploring the effects of information quality change in road transport operations. Authors have opined in this paper that despite technology have played significant transformation role in the transport industry, it is still an early study in research subject as to what is the impact of information quality in transport industry, especially IT-enabled quality information on decision making and firm performance. The authors conduct an exploratory comparative case study of three transport firms that have introduced the global positioning system (GPS) in their operations. The purpose of this paper is to focus on assessing changes in transport operations due to the use of the quality information GPS provides and the link between these changes and organizational benefits. Notably, it was found that different information quality affects transport operations in transport service planning, vehicle routing and transport control, result in improved customer service, enhanced transport asset utilization, reduced transport costs and time, and in increased satisfaction of employees working within the transport process.

Marian Oosterhuis, Taco van der Vaart and Eric Molleman (2012), the authors have talked about the importance provided to strategic communication in supply chain through different literature but not on day-to-day communication. An attempt has been made to investigate that when day-to-day operational communications could link to conflict so that to prevent it. The research used hypothesis that Communication on operational issues will only be positively related to conflict when suppliers do not recognize the importance that buyers attach to the performance objectives (quality, price, innovation, flexibility, delivery) in their relationship. 380 surveys have concluded the finding that operational communication are linked with conflicts if upstream parties do not recognize performance objective of downstream parties.

2.8 Technology & Radio Frequency Identification Device (RFID)

Attaran (2007) has examined on RFID: an enabler of supply chain operations. The author finds that RFID is the most recent prolific technology that provides supply chain collaboration and visibility. The paper provides an excellent conceptual discussion of the evolution of RFID, its capabilities and application in various industries, implementation challenges, identifies adoption phases, and reviews RFID’s success factors to go
beyond the hype and explore its promises as well as its shortcomings. Author has found that RFID systems solution will increase corporate ROI and communication. The biggest implementation challenge for RFID is the challenge for IT experts of determining how to integrate RFID with existing supply chain management (SCM), customer relationship management (CRM), and enterprise resource planning (ERP) applications. Its stumbling blocks are a variety of issues outside the technology itself: marketing problems, security and privacy considerations, and a lack of standards. Author has also confessed that the paper was constrained by empirical evidence as the technology is in its infancy for supply chain collaboration.

Kumar, et al. (2011) have studied on challenges with the introduction of radio-frequency identification systems into a manufacturer’s supply chain – a pilot study. This study identified the major challenges of RFID to be associated with supply chain and system integrations. Privacy, excess information and quickly advancing technology are all of concern to companies considering RFID system installations. Looking to the case study scenario provided here, many of the benefits are not quantifiable; this would indicate that the benefits of RFID can outweigh the challenges. Companies that use RFID are at an information overload. Research to understand what metrics would be value added, is the need of the near future.

Wamba (2012) has experimented on achieving supply chain integration using RFID technology - The case of emerging intelligent B-to-B e-commerce processes in a living laboratory. Despite the high operational and strategic potentials of radio frequency identification (RFID) technology, very few studies have been conducted about its role as enabler of supply chain integration to achieve high-level operational efficiency. The purpose of this paper was to explore the impact of RFID technology on inter-and intra-organizational processes and information systems. The results proved the role of RFID as enabler of better integration of timeliness and accuracy data flows into information systems, better system-to-system communication, business process optimization through automation, and better inter-and-intra-organizational business process integration. The study also revealed the importance of business process renovation and
complementary investments during the adoption of RFID technology, in order to achieve high level of business value from the technology.

YÜKSEL and YÜKSEL (2011) have examined on RFID Technology in Business Systems and Supply Chain Management. Authors expressed that in today’s fast-changing competition environment, companies and organizations need to renew their services and products, and change and replace their business processes with new ones continuously to benefit more from time and resources. Therefore data capturing, gathering and management technologies are always needed by companies to support their decision-making. The paper introduces a middleware for business models including RFID technology. Information about the advantages of RFID over other data gathering and Auto-ID technologies is given.

Wyld (2006) has exhaustively covered the topic RFID 101: the next big thing for management. This article examined the phenomenon of RFID technology as the principal means of identifying items in the supply chain and its implications for both management practice and research over the next decade. Its main findings are about how the technology is being utilized today and planned for in the future. In this article, the author has given the history of RFID technology, and how RFID provides organizations with a unique opportunity to create value for the organization. The article looks over the horizon at implications for management research, outlining how this represents a Greenfield opportunity for research in the broad management discipline.

Zelbst, et al. (2012) have examined on Impact of RFID on manufacturing effectiveness and efficiency. The purpose of this paper is to examine the impact of radio frequency identification (RFID) technology utilization in manufacturing firms for driving efficiency and effectiveness. Using systems theory as a basis, a RFID utilization and outcome(s) performance model was developed from the literature. Data from a sample of 155 manufacturers were collected and the model was assessed using a structural equation methodology. Findings indicate that utilization of RFID technology leads to improved manufacturing efficiency and manufacturing effectiveness.
Mehrjerdi (2011) has examined on RFID and its benefits: a multiple case analysis. The purpose of this paper is to identify the key benefits of the RFID on various industries and supply chains globally. In this research, author has looked into 10 different case studies and identified following benefits: automation; transparency; asset management; velocity; insight; traceability; security; reliability; and capability. RFID solutions enable to reduce operating costs through decreasing the labor costs, claims, and return. They also can reduce working capital by enabling reductions in inventory and lowering the inventory write-off from the return goods and those items that are un-saleable at the end.

Barjis and Wamba (2010) have examined on Organizational and business impacts of RFID technology. Their purpose seem to briefly discuss some aspects of RFID technology, potential applications, and challenges including scientific methods that will help to study the impacts of RFID implementation on businesses. As an introductory paper, this paper conducts a brief literature review, provides personal reflection on RFID technology, and consolidates expert opinions. It brings up the importance of business impacts as a result of new RFID systems introduced to organizations.

Thiesse et al. (2011) through this paper explores the enablers and limiters that influence the implementation of RFID Technology. The authors through a model identified top management support and involvement, Standardization and conformance to existing Standards, factors influencing past technologies for IT adoption like barcode, understanding of RFID benefits especially in terms of its business value, Supply Chain forces etc. as major factors influencing RFID adoption. The authors have based this paper survey and self-report data whose reliability is questionable, focused only on EPC standards (for logistics aspect of business) and a small set of factors, hence a further research is required to have an in-depth insight of the subject.

Frederic T., et.al. (2011), discussed the drivers and barriers of RFID implementations in practice, particularly in the later stages of the adoption process. Authors suggest that top management support, perceived technology costs and forces within the supply chain exert a significant influence on the RFID adoption process. The study also constructs and empirically tests a structural model including factors related to the
technology - (physical characteristics of RF communications, the integration of RFID with IT infrastructure, and the transformation of business processes), the organization size, and its environment - (mandates, governmental regulations and competitive pressure).

Balocco et al. (2011) through this paper brings out the reasons for under performance of RFID in FMCG despite a serious push from Walmart (Retail Giant) and identifies possible measures to make RFID adoption a success in future. The paper identifies the disinterest of Suppliers in making huge investment for RFID technology driven by their dilemma towards accuracy of Technology, Profit sharing (Cost to Manufacturer benefit to retailer) and Pallet wise or case wise tagging as reasons for under performance, however a clear strategy towards cost sharing, case wise tagging and pilot runs for understanding of benefits such as better tracking, customer service, time effectiveness etc. could help RFID in being effective in FMCG as well. When compared with Fashion industry, authors found that profitability, profit sharing and technology reliability are significant barriers preventing RFID diffusion in FMCG. Visich J.K., et.al. (2009) have investigated through an empirical study of available literature on impact of RFID implementation in businesses and have attempted to capture the benefits in 3 broad categories viz. automational effects on operational processes (like inventory control and efficiency improvements), followed by informational effects on managerial processes (like improved decision quality, production control and the effectiveness of retail sales and promotions) and finally, found hardly any evidence of having anyone achieved the transformational effects on operational or managerial processes. The research suffers limitations due to higher reliance on use of secondary sources and inconsistent definitions of performance measurement. The article helps identify implementation areas where RFID can have the greatest impact by better estimating ROI and payback period. At the end, authors have suggested a 3-stage model explaining effects of RFID on supply chain and 5 propositions for further research, followed by implementation advice for practitioners and academicians.
Mohsen Attaran (November 2007) has discussed the evolution of RFID technology, its success stories as well as implementation issues. He also lists the three phases in RFID adoption, namely – Elementary, Intermediate & final and factors which contribute to a successful adoption. In special he mentioned the role of top management and customizing the technology to your specific domain rather than using a slap & ship model. Author classified challenges to RFID implementation under the heads of fundamental (technology adoption drivers, difficulty in ascertaining ROI etc.), Technical (imperfect read rates, unproven systems, difficulty in analyzing the huge amount of data captured etc.) and Organizational (Handling business process changes, integration with in-house SAP and ERP systems etc.). The Author has also identified novel applications of RFID into Healthcare, Pharmaceutical, Defense and Gaming Industry.

YZ Mehrjerdi (November 2008) has discussed the nuances of RFID technology including its components (tags, readers, antenna, chip), types (active, passive, semi-active, semi-passive), frequencies (low, high and ultra-high frequencies) and basic cost structure of different components. Through a prior literature survey, Mehrjerdi has discussed RFID application/implementation in four unique and novel areas – Management of a Sushi Restaurant, logistic process knowledge based system (real time data capture), quality inspection & management in food industry, asset tracking in construction & healthcare industry. The article also highlights the current challenges in RFID technology - human expert challenges, privacy issues, global standardization challenges, high capital costs coupled with cost-benefit analysis justification etc.

Chieh-Yu Lin et al (November 2009) have explored the technological, organization and environmental factors which affect RFID adoption in Chinese logistic firms. Authors acknowledge though cost and time savings are a key factors for RFID adoption other factors such as organizational culture, hierarchy, related technologies, governmental support play an important role in actual implementation of RFID. Through a sample survey of over 1300 logistic companies in China and regression analysis authors conclude that factors such as explicitness of RFID technology, accumulation of related technologies in parent firm, innovation culture, better human resources and positive governmental support encourage RFID adoption while economic uncertainty does not
conclusively help or deter its adoption. However, the article did not study whether RFID adoption can directly lead to supply chain efficiency.

Karen Butner (2010) has performed a study of nearly 400 top executives of SCM in diverse industries to identify the top five problems faced by these managers. These are identified to be cost containment – managing cost volatility, supply chain visibility, Risk Management – using technology to manage and not merely counter risk, customer intimacy – being equally close to customers and suppliers, globalization – more revenues but more costs as well. The author also identifies three traits of a successful supply chain – Instrumented (larger dependency on RFID, GPS etc. for tracking), interconnected (real time flow of data and information) and intelligent (adaptive forecasting, contingency planning). In addition, technology will help supply chains become more flexible and nimble, allowing them to change the asset utilization and network flows even as new information is generated.

Park, K., et.al. (2010) has compared the industry perceptions of the importance of RFID technological infrastructure, RFID benefits & risks and the impact of the RFID on business performance in two countries - USA and South Korea. The authors in their research, did not find any discernable difference between the two countries, thus providing empirical evidence that RFID has become a comprehensive business tool to assist more seamless global SCM. However, different sampling and data collection processes used in the two countries and inability to address all of the factors (technical, organisational, cultural, and political issues) may have influenced the findings. The article also suggests - a scheme be devised to classify countries based on their RFID implementation, in-depth studies focusing on select constructs and variables, and time-inclusive model to be prepared for conducting further RFID implementation studies in various countries.

YZ Mehrjerdi (2010), reviewed the key elements of RFID technology (tags, chip and frequency) and its cost-effective application as productivity enhancement tool in SCM. Through a prior literature survey, author highlighted the practical utilities of RFID coupled Supply Chain - better supply chain efficiency, reduced counterfeiting, fraud controlling, improved work-in progress tracking, reduced administrative errors, reduced
rework, better warranette claims management, cost saving and profit enhancement. The author also discusses five novel areas of coupled RFID & Supply Chain implementation - real time monitoring of states of supply chain system, Sushi Restaurant management, Service level management of non-stationary supply chain, Supply chain costs and Reverse Logistics System.

Andrew Kach (Dec2011) has showcased the effectiveness of technology in enhancing Supply chain efficiency. Here he discussed the application of RFID Technology in elimination of waste and attaining lean manufacturing for Renault's complex operations, the benefits of practical test runs over theoretical assessments and inability of RFID to provide a complete solution to supply chain concerns. The article highlighted the achievements of RFID such as better process efficiency and inventory control, availability and clarity of information to internal and external stakeholders (suppliers) leading to accuracy in forecasting and improved planning. However it also suffers its limitation in handling financial and political production factors.

Clemens, Byron; et.al (2012) have discussed the considerations or factors for the rapidly evolving mobile and handheld devices to be utilized not only for leveraging the data collection and transaction handling, but also to build robust tools for enabling management decision making in supply chain management, ERP and any other complimentary decision-support systems as prevalent in industry. This paper also discussed history of devices used till transition to mobile devices and recommends that applications must be built on mobile devices to not just meet the mobility expectations of internal users but the external business partners e.g. suppliers as well.

Zhang, Zeng et al. (2011) through this paper conceived the framework where RFID technology can be alternatively used as a tracking tool in Logistics/ Service Industry. The authors has focused on simplifying the complexity in handling information flow in a Supply Chain Structure by proposing an integrated model based on information requirement of business functions and service players. Though the proposed model is theoretical but it explains a possible way of utilizing RFID for tracking real time data from various stages of supply chain and its prompt analysis for enhancing the robustness of supply chain management of service industry.
Wamba, Samuel Fosso (2012), conducted case study in a retail supply chain to access the impacts of RFID implementation on supply chain integration. Author in his study, used multi-method approach - combining a longitudinal real-life case study and integrating “living laboratory” strategy, involving all members of a product line to analyse their contributing activities and their interface with other supply chain members. The study supports role of RFID as enabler of better integration of timeliness and accuracy data flows into information systems, business process optimisation through automation, better system-to-system communication and better inter-and intra-organisational business process integration. Study also reveals the importance of business process renovation and complementary investments during the adoption of RFID technology, in order to achieve high business value.

Kvarnstrom B. and Vanhatalo E. (2010), explored the application of RFID to improve traceability in the flow of granular products by undertaking a case study of tracing iron-ore pellets in a Swedish Mining Company (LKAB). The research shows that RFID technique can be used to improve traceability in granular product flows, however only a single case has been studied, and the results are generalised for granular product flow. The article also highlights issues concerning the use of RFID in process industries - problems to control orientation of the transponder in read area and risk of product contamination in the supply chain.

Barbara A. Osyk, et.al. (2012), examined RFID implementation in warehousing using empirical data to view the transformation in warehousing industry with respect to RFID implementation. Through an online survey sent to WERC members (manufacturing firms, third party warehousing/logistics providers, distributors, and retail firms), author determined what challenges they are facing in implementing RFID technology. This when compared to an earlier study, Authors found that - fewer organizations are now considering the technology. Authors also detected less optimism in RFID and concerns on ROI, potential benefits and supply chain integration among the respondents. However, study was limited to a relatively small sample of WERC members which may have influenced an error in the findings.
Frank W., et.al.(2011) through a survey, examined the value creation process of e-business (EB) applications from a supply chain perspective. Authors claim that the suppliers’ EB readiness plays a moderating role in the value creation process throughout the supply chain. Based on the resource-based view (RBV) and previous research, this article illustrates that EB applications - EB interaction applications, EB coordination applications and EB integration applications have a significantly stronger positive impact on operational performance only when company’s key suppliers are ready and willing to engage in EB (suppliers' EB readiness). However, data collected relied on a single respondent in a management position within the purchasing department, having multiple respondents might have provided more accurate results.

Koh C. E. and Lim S.H. (2009), explored organizations’ perception of impact of RFID on business performance in relation to the perceived technology-organization fit and the risk in technology. Through a prior survey conducted, the author suggests that management of organizational fit factors in connection with perceived risk levels has a significant effect on the perceived impact of RFID on business performance. However, the sampling process author used is not completely scientific and random. The research constructs and variables measure perceptions and expectations of respondents rather than objective, factual data. As a result, some findings may not be applicable to the general population. The article identifies several organizational factors that a company must assess prior to implementing RFID to ensure that the technology is properly aligned with its business.

Azevedo et al. (2011), explored an alternate array of possible RFID applications in FSCM. In this paper the supply chain of six companies using RFID Technology are studied and benefits as well as barriers (integration with current process, change management, cost) were identified and analyzed, which in turn is utilized to develop a conceptual framework in FSCM using RFID technology which despite its huge cost, provides opportunities to save, improve processes, inventory control and visibility.

Wamba (2012) has presented the benefits of Supply Chain Integration – Internal as well as with Channel partner, assessed the findings of various articles on RFID adoption for the purpose and Evaluated RFID as a solution for integration of Inter-Organization
Information System (IOIS) through a study of RFID enabled Supply Chain, developing a scenario of IOIS and validating it by a Proof of Concept using ‘Living Laboratory’ strategy. The study shows the potential of RFID in process transformation and support BPR over incremental improvement for achieving high operational benefits but it ignores the feasibility of the same through a cost benefit analysis.

Frank W., et.al. (2011) through a survey, examined the value creation process of e-business (EB) applications from a supply chain perspective. Authors claim that the suppliers’ EB readiness plays a moderating role in the value creation process throughout the supply chain. Based on the resource-based view (RBV) and previous research, this article illustrates that EB applications - EB interaction applications, EB coordination applications and EB integration applications have a significantly stronger positive impact on operational performance only when company’s key suppliers are ready and willing to engage in EB (suppliers’ EB readiness). However, data collected relied on a single respondent in a management position within the purchasing department, having multiple respondents might have provided more accurate results.

Katerina Pramatari T.E. and Georgios Doukidis (2009) have presented that Internet-based platform or e-business has created challenges and opportunities in SCM. Internet has made Information sharing so fast through the chain to improve operational performance, customer service, and solution development. This further brings development in core business and redesign, new organizational forms and inter-organizational structures. Authors have taken example of grocery retailing and FMCG sector and detailed how technological and managerial innovations have transformed retailers, distributors, and manufacturers into more effective organizations which interns has improved Efficient Consumer Response. In implementation phase several technical, organizational, and multi-party coordination challenges had to be overcome.

2.9 IT and Management

Linying Dong, Derrick Neufeld and Chris Higgins (2009) have discussed the criticality of top management support (TMS) in implementation of large-scale information system (IS) projects. Paper reviews, which spans research on innovation diffusion, IS
participation, IS escalation, strategic IS planning, and IS implementation, reveals a weak understanding of TMS. TMS in implementation and action affecting the implementation is very crucial for filling the gap. Further analysis by authors on two Canadian universities implementation for enterprise system revealed three types of actions from top management: resource provision, change management and vision sharing.

Jerry Luftman, et.al. (2013) have discussed the impact of IT for Organisation particularly in global financial crisis and it becomes more crucial to understand the difference between IT managerial and technical trends. IT cost reduction reached to the top 10 global management concerns and business productivity and cost reduction are at the top position world over except for Latin America, where organizations are focused in developing IT to increase productivity and cost reduction. Paper also discusses that there are similarities in many implementation; however local trends are equally important. Wherein in most of the European organisations local factors so predominant that they have taken priority over global factors.

Brian W. Rooks (1997), in his article described Festo’s new Applied Automation Centre in Northampton that houses showrooms, administration block, production and warehousing facilities, national training centre for own employees as well as Didactic (Festo’s automation training company) under one roof. Author reports that developments such as -precise pneumatic positioning, AS-i intelligent cabling systems, integrated microprocessor-based controls within pneumatic systems and fieldbus system in intelligent pneumatics will drastically reduce costs and improve machine flexibility for manufacturers.

Peter Neumann (1999), observed that for technical and economic reasons, industry is moving away from a single unified international fieldbus standard. Author in his research, discusses distribution of application functions to process-oriented field devices and process-remote components in dispersed automation systems. Article also describes the use of various fieldbus systems and function-block technology on standardised function blocks, requiring a appropriate infrastructure to enable these function blocks cooperate during run time.
2.10 Integrated electronic supply chain

Author has explained the importance of integrated electronic supply chain, also known as Integrated System Solution, for Eastman Chemical Company. The state-of-art ISS implemented with the integration of SAP and APO in US and same challenge implement the same in Asia Pacific business region for ECC. The short coming of ISS is also discussed which arise due to problem in adoption of the technology by various stakeholders of the company and the XML technology, used by Eastman Chemical Company, to overcome the shortcomings is explained. The business benefits w.r.t customer centric, brand building, knowledge management and cost is also outlined.

Author has discussed the situation of out-of-stock and out-of-self situation for retailers and presented a case study on Internet-enabled collaborative supply chains. Author also suggested that it’s just not the high-level strategic planning, but a successful implementation of collaborative supply chain project requires successful implementation of enabling IT systems. First pilot run has revealed that coding algorithm for strategic ordering in inventory has led to shut down of system with much wrong ordering, delay in process and confusion among the on-site worker. Only the process of coding end-user requirement with correct installation of IT systems has led to success.

Author has presented Information Management survey conducted among 787 organizations across four different regions of United States, Europe, Asia and Latin America to tap influential factors in IT trends. The factors considered in research methodology were: Management Concerns; Application and technology investments; IT organizational Considerations. However highlight of the studies remains with the top five management concerns ranked as: (1) Business intelligence, (2) Cloud computing, (3) Enterprise resource planning, (4) Apps developments, and (5) Customer relationship management.

2.11 Techno-change Management

Author has discussed about how the change in IT can lead or trigger to organizational change i.e. technological driven change: Techno-change. It has been expressed that though the process of techno-change can bring potentially high reward but can create
high risk as well. The article talks about the techno-change, which though focuses on project cost, project schedule, solution functionality but does not effectively implement organizational change. Thus author talks about the solution which suggests completeness, wherein IT change is complementing with Organizational change; alignment between IT and organizational process, culture, incentives; and division of outlined benefits envisaged for both IT and organizational change.

2.12 Top management Support for IT support change

Author talks about the study conducted through case studies in two universities to refer the importance of TMS in implementation of ISS in an organization: TMSR, TMSC, and TMSV.

Data from university A and B suggests that only strong resource provision didn't positively influence user satisfaction / usefulness; as intertwining relationship between all the TMS, just a change management and / or vision sharing function alone didn't ensure the successful implementation of ISS. But it is found that successful implementation of ISS is achieved by ensuring top management’s support on resource, change management and vision sharing on various stages.

2.13 Sourcing and Procurement

Martin Christopher, et.al. (2010) have talked about the risk involved in Global sourcing of products. A research has been conducted to find out the answers of two questions, objectively: How do managers assess global sourcing risk and what action do they take to mitigate it. The major risks of global sourcing are revealed by the cross-case analysis: supply risks, environmental and sustainability risks, process and control risks, and demand risks. Four generic strategies have been suggested by the author: network re-engineering, collaboration, agility and a risk management culture. Also scope for further research is suggested to improve the generalizability of findings.

K.W. Platts, N.Song (2010) presented a paper on comparison of perceived cost saving and actual cost saving due to sourcing from China. To evaluate the same, Total Acquisition framework is made with the understanding of cost involved from the
practitioners of industry. The design of framework was made from external cost: price, discount terms, ordering costs, transportation, supplier visits, tooling and technical support; internal cost: inventory cost, delivery expediting cost, line down cost and non-conformance cost. The study concluded that on an average, prices accounts for two-third of the total on-going cost as perceived as four-fifth of the total on-going cost with much less variability.

Paul R. Drake, et.al. (2013) through prior literature surveys and logical arguments argued that Purchasing strategy must be designed at the component level of products to match and thereby support business strategy and address the weaknesses in Kraljic-type models. Authors’s model extends the Fisher’s product classification (as functional or innovative, to determine whether they are suited to lean or agile supply) to the component level with augmenting the agile and non-strategic supply options. Further this choice depends on the impact a component has on the four competitive priorities; cost, quality, time and flexibility. However, this model has been only tested on two case studies, which limits the generalisation of the findings.

Konstantinos Kirytopoulos, et.al. (2010), have described the situation of decision making of sourcing in a supply chain. They worked on the model of multi-criteria decision making (MCDM) and provided a meta-model for evaluating supplier and order quantity allocation based on MCDM, Analytic Network Process (to assess the qualitative value of supplier) and multi-objective mathematical programming method, AUGMECON (proposed for the allocation of the order quantities among suppliers. The said model is illustrated through case study of para-pharmaceuticals enterprise in Greece. The limitation of study defines it as customized to the enterprise cluster structure.

Nasiri Reza G, et.al, (2010) have addressed the criticality of inventory management through distribution planning decision. The purpose is to design an integrated distribution centre location, allocation and inventory decisions for multi-commodity supply chains in a stochastic environment. A model was developed for same as a non-linear mixed integer programming using Lagrange relaxation. The proposed model in this paper not only minimizes the total distribution and inventory costs but also
considers the customer service level and warehouse capacity utilization. There is also a future scope to this model for multi-type, multi-level warehouses.

Remko van Hoek, Janet Godsell and Alan Harrison (2011) have talked about the relevance about guest lectures (GL) from the industry for students of supply chain, as to why it is important to improve links between industry and academia. Focus of the paper has been on the concept of “insight from industry” into Supply chain programs that a business school offers through guest lectures. However, two key challenges are discussed: how to effectively incorporate the GL into the SC program, and secondly, how to recruit and retain the GL. The paper provided seven tips to help faculty tackle the first challenge. This was supported by a framework of the categorization of GLs.

Erik Hofman (2011) has described the situation faced by supply chain industry during recession and post-recession. Two purposes have been outlined: to describe the concept of natural hedging in supply chains, and to highlight the potentials of natural hedging as a risk prophylaxis and a supplier finances approach. Reductions in Financial risks, risk with market vulnerability, risk of supply chain disruption as a cause of SME insolvency, are the strengths of natural hedging, along with volume discounts, achieving scale economy throughout commodity supply process ; However, same cannot be generalize in every context, crucial to monitor additional cost, cannot be reversed easily after implementation are the weakness explained.

Miemczyk et al. (2012) through this paper explores the purchasing aspect of supply chain while reviewing its sustainability (including social, environmental component as well) and its operationalization at three levels namely dyad, SC and industrial network. The authors identified the inherent difficulty in analysis of purchasing and supply at network level (also at chain level) which might have been the reason for the lack of research of the aspect. They also succeeded in developing measures and its categorization enabling the understanding of operationalization of the research. The paper also highlighted the deficiencies in past researches with similar objectives. The paper provided a good insight to the purchasing aspect of supply chain; however it ignores the other aspects completely. Also the research was limited to definitions and measures hence narrowing its scope as well as its findings.
2.14 Case Studies of Supply chains of different Industries/service sectors

Nigel Wild and Li Zhou (2011) in this article have discussed the ethical risks for an organization, and considering that presented a paper on developing a conceptual framework for collaborative Ethical Procurement Due Diligence between International Aid Non-Government Organizations in Humanitarian Supply Chains. Research has identified that criticality for commercial supply chain is the commitment with commercial organizations, enabler is improved profits. Whereas there can be fundamental differences in the purpose, function, cultural value sets, cost, time and capacity among IANGOs and their supplier. The enablers for NGOs are the ethical value set with established trust and respect.

Ruerd Ruben and Guillermo Zuniga (2011) have presented a paper on smallholder farmer’s coffee production, delivered to fair trade, Rainforest Alliance & Café Practices labels or independent traders in Northern Nicaragua. The objective of the paper was to address the issue of different private and voluntary standards for market incorporation by comparing effects of income, production, investments with the implications of risk behavior, organizational force, loyalty and gender attitudes. While private labels offer better yield and quality, fair trade provides better prices and helpful to support initial market incorporation. 315 farmers were involved for the research conducted.

Jalalvand F, et.al (2011) have argued in this article that Comparison of Supply Chains can enable its owner to find its strength and weakness of their process and also improve on their competitive advantages via benchmarking against the best and most effective. Author has proposed a five process method provided by SCOR model version 9.0 (i.e. plan, source, make, deliver and return) with the model of Data Envelopment Analysis and multiple criteria decision technique to develop a new method of comparing Supply Chains of an industry from the scope of supplier’s supplier to customer’s customer.

Halder and Pati (2011) have undertaken this study through secondary data and discussed about the need for developing proper supply chain for fruits and vegetables, being the perishable commodity, by bridging the gap between rural and urban India.
The authors have elaborated about the challenges and opportunities in an agrarian society like India and have suggested approaches such as collaborative forecasting, incorporating a pull system for production rather than a push system, demand-based production, sharing risk and rewards by the supply chain partners, increased usage of IT, data integration, vendor management, warehouse and logistics management etc. Authors have deliberated on entry of organized retail sector in this sector of agriculture based products and hence argues a vast potential of benefits untapped so far.

Burcu Adivar et.al. (2010) have identified the need of introducing social welfare chain followed by the study of social welfare policy and review of humanitarian literature. An optimal facility location distribution model, which consolidates the non-integrated style of logistics functions with a cost minimizing approach, is developed using General Algebraic Modelling System. The study provides a real-time and cost efficient solution to a social welfare issue by an efficient distribution model. Additional contribution from this can be gained by extending it to multi-product and multi-period case. Moreover, additional insight on marginal costs and marginal utilities of the aid distribution can be derived as well.

Qinghua Zhu, et.al. (2010) have based this study in China, for addressing the various regulatory and community pressure for an organization for greening its supply chain. To ensure the methodology of evaluating suppliers using their portfolios, analytical network process and environmental factors are used. Supplier classification model is developed where in grading to a supplier portfolio are allotted on the axis of Supplier’s overall performance and Supplier’s relative power. Performance measures considered to develop the models are: cost, quality, time, flexibility, process management, innovativeness; organizational actors evaluated are culture, technology, relationship; environmental factors evaluated are pollution control, pollution prevention, environmental management system, resource consumption, and pollution production.

Remko I. van Hoek, et.al. (2002), described the critical challenge in the realization of supply chain objectives of attracting capable supply chain managers. Author claims that much of training in logistics and supply chain management focuses on the technical aspects however, the importance and criticality of the human aspects have become
increasingly apparent. Authors call for a new approach to the people dimension wherein, a set of emotional capabilities (exceptional social skills, ability to influence, ability to arrive at collaborative win-win strategies and a less stressful and more fulfilling life), combined with the technical capability would transform the industry. The article also suggests approaches to take and the need to incorporate them in the development of people in supply chain management.

Candace Y. Yi, et.al. (2011), studied the flexibility strategies that supply chain participants would undertake while responding to many perceived environmental uncertainties. Supply chain can be hit from unpredictable dynamics in the upstream suppliers (material quality reliability and responsiveness of vendors), downstream customers (demand forecast errors and product obsolescence), or competitors (arising from low entry barriers and aggressive competitive stands). Authors identified four types of SC flexibility strategies according to their capability to mitigate perceived uncertainties - laggard, conservative, agile, and aggressive. The results also conveyed that one would have to match the adoption of flexibility strategies with firm’s business environment and that improved supply chain responsiveness can be achieved in two ways: by reducing uncertainties and by improving supply chain flexibility. However, the research focuses only on the clothing and textiles industry, which makes it difficult to generalize the results to other industries. Furthermore, the subjective criteria deployed in some constructs, may induce an error in the result.

2.15 Multimodal supply chains: iron ore from Australia to China

Beresford et al. (2011) through this paper assessed the existing multimodal transport for iron ore exported from Australia to China. The authors analyzed the possible combinations of routes and modes of transport with respect to lead time, capacity, and cost of each leg for shipping of iron ore from Australia to one of China’s manor steel producer. It highlighted that cost efficiency of Sea leg of transport hence maximizing the same and minimizing the land aspect of transport, while analyzing the advantage of cost and volumes of railways over flexibility, speed and reliability for road transport, when on land. It also emphasized the importance of large volumes in bulk cargo movement to offset the disadvantages of huge lead time for delivery. Though the combination
suggested for the China’s iron and steel major might not be universalized but it provides a good insight of feasibility of various transport modes with respect to Australia and China.

2.16 Management of service supply chains: the case of management consulting

Giannakis (2011) through this paper explores the possibility of validating the supply chain of service industry through SCOR model and design a generalized reference tool for evaluation of Service Companies. The author through his SC model has emphasized on the standardization of Service functions and conceptualized six major processes: plan, source, develop, adapt, operate, and recover; for the design and management for service supply chains and established capacity as resource inventory for designing service package, hence making referencing as well as benchmarking a possibility which can lead to evolution of the industry. The paper provides a base for further research to develop a more comprehensive model as well as act as framework to assist managers to create their own referencing tool.

2.17 Service quality in supply chain: Indian Auto Industry

Prakash Gyan (2011) through this paper has emphasized on the significance of Service Quality (SQ) and its evaluation in manufacturing SCM in order to attain competitive edge and supplier’s satisfaction and loyalty. The author through a conceptual framework, research hypothesis and methodology suggested the Measuring parameters (adaptability, agility, alignment, assurance, reliability, responsiveness and tangibility) to evaluate the Internal SQ (linked to manufacturer) and External SQ (supplier) and highlighted their interdependence for enhancing performance and business value. The results of the paper were insightful but the model were tested only on Automobile manufacturing set up and is limited to Supplier-Manufacturer aspect of Supply chain, hence cannot be universalized. However small sample size, functional perspective of service quality and un-weighed “performance only” measures for analysis of service quality remains limitation of the research.
Yang Ching-Chiao and Hsiao-Hsuan Wei (2013) empirically identified four important aspects of security management in the container shipping sector: information management, facility and cargo management, accident prevention and processing, and partner relationship management. Authors performed multiple regression analysis and revealed that partner relationship management have significant positive impacts on safety performance and customs clearance performance. Information management also have positive noteworthy effects on safety performance. However, additional costs in the short-term investment for security initiatives limits the applicability of security management.

Des Doran and Mihalis Giannakis (2011) in their research explored supply chain integration characteristics and constituent elements of construction modularity, using a case study approach to examine integration of construction supply chain modules - manufacturer, frame manufacturer, Heating Ventilation and Air Conditioning (HVAC) supplier, turnkey supplier, and client. Authors found a need to increase supply chain integration to ensure that modular solutions can compete more effectively with traditional, on-site solutions. Authors suggests that some of the negative attributes associated with modular buildings may be mitigated through effective positioning of suppliers on the Relationship/Supplier Integration Matrix and the assessment of suppliers via process mapping activity.

2.18 Making connection between supply chain management and sustainability

Ashby et al. (2012) through this paper assesses the representation of sustainability dimension in SCM by systematically reviewing and comparing literatures/journals on the subject especially focussing on the social and environmental aspects. The paper highlighted the growing importance of Sustainability in SCM. It identifies the lack of emphasis on Social aspect of SSCM in past literatures which focussed mainly on environmental aspect, the reason for the same being lack of research and inherent complexity in its quantification of Cultural and Societal elements. The paper gives a detailed insight of the deficiencies in the past research while establishing the basis for future research as well as it brings out the importance of Environmental and Social aspects of SSCM but the economic aspect is ignored.
Abbasi et al. (2012) through this paper explores the key aspects in making supply chain sustainable while focussing on environmental dimension and brings out dependence of sustainable development on SCM by systematically analysing and critically reviewing the journals/literatures on the subject. The authors identified major themes (management issues, transport emissions, reverse logistics etc.) and challenges (operationalization, uncertainties, Cost, mind-set and cultural changes, complexities); highlighting the need for development of a framework utilizing the same as basis for future research on development of SSCM. The paper gives a good insight about the factors hindering the evolution of SCM into Sustainable SCM emphasising more on environmental aspect, however without exploring into social as well as economic factors a holistic framework for SSCM cannot be generalised.

Gimenez et al. (2012) through this paper aims at the extension of sustainability to suppliers by investigating the governance mechanisms and its effect on sustainable (economic, environmental and social) performance through systematic review of articles/journals on the subject. The paper shows the importance of collaboration with suppliers along with assessment of suppliers in improving environmental performance and CSR as well as deriving economic benefits hence benefitting the triple bottom line (social, economic and environmental), however they alone are not enough to extend sustainability in supply network. The paper identifies enablers (both internal and external) for the purpose. The paper gives a good insight on the two approaches for improving sustainability but does not provide the effects of enablers identified on the approaches. Also the reliability of the findings are subjected to the quality of the articles reviewed.

J.C. Vicedo, et.al.(2011), analysed the knowledge generation process in a multi-level SC formed by Small and Medium enterprises (SME) and proposes a knowledge network model represented within Social Network analysis(SNA) techniques to gain a better understanding of the knowledge creation and transfer process. The research shows how establishing these inter-organizational relationships into networks leads to knowledge exchange among the companies and creation of new specific knowledge by promoting confidence and motivation and by establishing alliances, team spirit and
better coordination and communication among the enterprises involved. Authors claim that this brings-in higher degree of innovation, fewer losses, and improved efficiency in transactions and production.

Baldwin J, et.al.(2012) conceptualised an alternative conceptual model for understanding green supply chain management (GSCM) in terms of natural resource based view (NRBV) and its interactions with GSCM performance measure and institutional drivers. Authors identified operational, environmental and financial measures that influence the impacts of GSCM practice, and formulated causal relationships through both existing empirical findings and by identifying theoretical propositions. The model, however is purely conceptual and empirical tests of the model and hypotheses are required, before being implemented by managers to evaluate their strengths and weaknesses in GSCM implementation.

Wiengarten, Frank et.al. (2011) through a survey, examined the value creation process of e-business (EB) applications from a supply chain perspective. Authors claim that the suppliers’ EB readiness plays a moderating role in the value creation process throughout the supply chain. Based on the resource-based view (RBV) and previous research, this article illustrates that EB applications - EB interaction applications, EB coordination applications and EB integration applications have a significantly stronger positive impact on operational performance only when company’s key suppliers are ready and willing to engage in EB (suppliers’ EB readiness). However, data collected relied on a single respondent in a management position within the purchasing department, having multiple respondents might have provided more accurate results.

Ying Xie and Liz Breen (2012) designed a pharmaceutical supply chain (PSC) that minimises preventable pharmaceutical waste and effectively disposes inevitable pharmaceutical waste by adopting a cross boundary green PSC (XGPSC) approach. Authors claim that XGPSC identifies participants’ contribution to the PSC and, peripheral influences from professional and regulatory bodies. Authors also recommended four environmental practices: top management commitment, supplier certification and cooperation, customer cooperation, and eco-design to make PSC greener. However, non-verified\non-tested XGPSC applicability, single case study of
community PSC in UK and lack of involvement of all PSC parties remain as limitation in the application.

Khan Omera, et.al. (2012) through a case of study of Fashionco Group (UK’s fashion retailer) argued that the alignment of product design with the supply chain improves supply chain resilience, supply chain responsiveness and competitive advantage for the focal company. Adopting a “design centric” approach, Fashionco repositioned itself from a value-end store to a leading global fast fashion retailer by quicker development of new products with shorter time to market, and supply chain risk management (reducing potential supply chain disruptions). Authors also highlighted that improved supply chain costs and performance can be achieved by aligning product design and the supply chain.

Svensson Goran and Wagner Beverly (2012) described corporate implementation and application of “sustainable business cycle” in Wapno Dairy. Authors divided Wapno’s “sustainable business cycle” into nine stages beginning with the arable land, animal feed, bovine animals, milk(ing), dairy, load(ing) buffer, transportation of products to market external retailers and consumers. Article also illustrates the challenges for an SME with a sustainable business cycle trying to extend its reach in highly competitive market and to create awareness of added value to the consumer. Authors believe that change in consumer behaviours and purchasing patterns, as well as state interventions imposed at top political levels worldwide, will gradually increase the necessity to create sustainable business cycles.

Soosay Claudine, et.al.(2012) through a case-study of Oxford Landing wine chain demonstrated applicability of sustainable value chain analysis (SVCA) as a tool for promoting better alignment between the allocation of resources in the supply chain and consumer preferences in a specific target market. Authors employed value chain analysis (VCA) and life cycle analysis (LCA) to determine activities that create value (in consumers’ eyes) and the contribution of these activities to greenhouse gas emissions. Authors then also demonstrated the potential trade-off that exist between the consumer value and emissions associated with activity, and cautions about the danger of focusing on either one (adding value or reducing emissions) in isolation. However, the study
focuses only a single product (Oxford Landing) and single supply chain to a UK, making it difficult to generalise results of the study.

Malin Song, et.al. (2012) argued environmental logistics should be implemented to promote the energy conservation and sustainable development in China and suggested four methods for its effective implementation: efficient railway and highway transportation, competitive mechanisms, expand railway freight transportation and strengthen highway traffic energy-saving simultaneously and, strengthen the relationships among industries. Authors also empirically analysed the relationship between energy consumption of logistics and its influential factors in China, and identified mileage traveled by train, the most important factor of energy consumption in LSI. Mileage traveled by train had negative correlation with total energy consumption. However, deficiency of data in China indicate that the conclusions of the research are approximate values and not the accurate ones.

Kenneth Green W Jr. et.al. (2012) carried out empirical investigations to assess impact of green supply chain management (GSCM) practices on organizational performance. Using structural equation modelling, authors incorporated green supply chain practices into the model to support environmental sustainability throughout supply chain. Authors found that adoption of GSCM practices by manufacturing organizations lead to improved environmental and economic performance, thereby enhancing the organizational performance. Article also suggests that internal environmental management and green information systems are antecedents to the implementation of eco-design, green purchasing, cooperation with customers and investment recovery.

Chunguang Bai., et.al.(2012) devised a Grey based neighborhood rough set methodology to help evaluate, select, and monitor - environmental and business performance measures for sustainable supply chains. Authors used supply chain operations reference (SCOR) model to develop measures (both business and environmental ) for supply chain sourcing, and found that variations in outcome considerations may greatly influence key performance measures for a sustainable supply chain performance management system (PMS). However, methodology is conceptual and evaluated using synthetically generated data set, a physical world
application with real data might provide additional insights and practical validity into its capabilities and limitations.

Hitchcock Teresa (2012) discussed the growing supply chain legal and commercial pressures, their causes and implications for countries with large consumer market and for supplier countries that themselves are important consumer markets. Article reveals that it will be a challenge for supplier countries to meet new regulatory and supply chain management standards, as these will intervene in the established contractual arrangements between suppliers and their customers. Growing consumer demand for “greener” will also prove to be a challenge in maintaining sustainable supply chain.

Lee Tzong-Ru (Fiun-Shen) and Yenming F. Chen (2012) have talked about the firm, in first world, which runs some polluting operations, and its movement to pollution havens wherein the firm can take advantage of lose regulations on environmental standards, easy land access and additional premium policies. The paper attempts to examine behavior of polluting firms, its relationships with supply chain members and green technology process. This paper investigates migration strategies by theoretical derivations and empirical investigations, concluded that the firm are motivated to stay in its home country and to choose rather in investing in green technology in a view of economic analysis.

2.19 Different definitions of SCM

A plethora of literature talks about supply chain and while reviewing these literatures, one would soon realize that there are as many definitions as many of those who cared to write about it. It means that this subject never remained stand still and has been continuously evolving since its inception. A cross section of review of literature provides following few worthwhile definitions. Let us first look at different definitions of Supply Chain and later at Supply Chain Management (‘SCM’ as abbreviated here in this document elsewhere):

As per Dr. Dawei Lu (2011), “Supply Chain is defined as a group of inter-connected participating companies that add value to a stream of transformed inputs from their
source of origin to the end products or services that are demanded by the designated customers.”

Cooper et al. (1997, p. 2) defined it as “Supply Chain Management is the integration of business process from end-user through original suppliers that provides products, services and information that add value for customers”.

Stank et al. (2001, p. 30) defined it as “Supply Chain Management is generally considered to involve integration, coordination, and collaboration across organizations and throughout the supply chain”.

Mentzer et al. (2001, p. 18) put it, Supply Chain Management is “The systematic and strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole”.

Ellram and Cooper (1990, p.2) defined as “Supply Chain Management is an integrative philosophy to manage the total flow of a distribution channel from supplier to ultimate customer”.

As developed by Council of Logistics Management (2003) cited in Gibson et al. (2005, p. 22), “Supply Chain Management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities, Importantly it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, Supply Chain Management integrates supply and demand within and across companies”.

As per Oracle Tools - the ERP solution, Supply Chain Management (SCM) is a set of various activities in which raw materials are purchased and transformed into semi-finished or intermediate goods, which eventually become the finished goods. These finished goods are then distributed to the customer using the distribution channel. This
complete cycle from supplier to customer is called the Supply Chain Management process.

A customer focused definition of supply chain management as given by Hines: "Supply chain strategies require a total systems view of the linkages in the chain that work together efficiently to create customer satisfaction at the end point of delivery to the consumer. As a consequence costs must be lowered throughout the chain by driving out unnecessary costs and focusing attention on adding value. Throughput efficiency must be increased, bottlenecks removed and performance measurement must focus on total systems efficiency to be responsive to customer requirements."

At the end of a supply chain is the product and / or service that are created by the supply chain for the end-customer. The degree of how well a supply chain has been able to serve the customer, ultimately decides its competitive edge for the market place.