CHAPTER 2

LITERATURE REVIEW

2.1 Problem Formulation

By means of this research, we intend to observe first working mechanism of Supply Chain and Management (SCM). Logistics is a significant process which the product or raw material reaches its destination from the source. The inverse idea of the forward logistics is called Reverse Logistics (RL) where the recovery mechanism and repair of the goods is dealt. There is much Information and Communication tools existing out which have been implemented to support and make more convenient the SCM and RL. In south East Asia SCM and RL has spread over market very efficiently and has a significant contribution in GDP.

Further it is intended to observe the loop holes in the operating methodology of ICT in SCM and RL. It also includes the nature of results and efficiency of the process. After this a SMT and CPU model are proposed and discussed for the returned products which can make the mechanism more efficient. Role of ICT is also observed in a transitive relationship between supplier and another end user. A product dispatched from the manufacturing unit to reach to the customer. After using the services of the product the product may also be made available for another end user and this practice is growing exponentially. Surprisingly the base on which this practice is performed called ICT. In India only this market is billion dollar worth. Such a big market which grows on exponentially looks ahead more phenomenon hike.

2.2 Retail market while selecting ICT as a research problem

As it is mentioned that in South East Asian countries (Chine, Taiwan, Japan, Indonesia, Hongkong, India etc) the SCM and RL is functioning with due policy and systematically so area for research has been selected a country within it ie. India. In India more than 94% of retail is unorganized hence it has tremendous scope for improvement and implementation of ICT. We should also understand that why such a huge part of the retail sector is unorganized? Actually retail sector generates the concept of employment which does not need any skill. Hence most of the people who are involved in the retail business are not skill based. Anyone who is citizen of India and mentally fit can do this business. Hence with this mind set the man power who is
involved do not secure any specific skill. Naturally these businessmen would hardly wish to be part of the mainstream economy. Subsequently is they keep their self side lined then of course they are not part of taxpaying club. Hence ultimately the huge picture of the retail sector which comes out is unorganized however in most of the cases skill based are people are working in this sector are for policy making. After introduction of ICT the shape of retail is changing drastically. Retail stores are getting more equipped with many products under same roof. All the products are scanned through ICT tools for database creation and post processing. Magically people who are working with retail store are skill based and active contribution in economy. This major unorganized sector is getting figure out in system rapidly. Actually it started right after the new and liberal economic policy which were introduced in 1991. More market players are trying to get into this market. Another reason being that the PPP(Purchase Power Parity) is increased of middle class employees and hence they are ready to spend on their life style. Since the growth is exponential hence this also infers that retail domain has many scope for correction. Because of selection of this domain and deep interest in this concept, I have always been well versed with what is happening in the world of SCM, and for the same reason I have gone through a large magnitude of research papers, journals, books, and IEEE online research paper materials. This has significantly reduced the time I would have otherwise invested in information gathering for this research. Hence I am in position to utilize this gained time in investigation this domain in finer detail.

The most motivation factor about this research topic is that on completion of this research work, the knowledge gained thereof would be beneficial not to an individual, but to the whole environment.

Another motivating factor is that I could get the opportunity to perform few field visits at related operating agencies. The retail store I visited are Fair Price store, Malaika Retail in Mumbai and tried to understand the idea implemented in SCM and return management. Further the execution of IT mechanism was seen at Reliance Gas Transportation Infrastructure Limited (RGTIL), Navi Mumbai which has major stake in Natural Gas transmission and distribution business. The distribution and transmission are controlled and monitored by fully automated system which is incorporated with Information Technology.

2.3 Extensive Literature Review:
The significance of literature review is nevertheless an encouraging process specially when we are in search of anything new. Before we proceed to research most importantly first question comes in my mind is why do we need to have a search? The simple answer I got it as when we don’t have a direct solution then we need to have a search. A simple example can elaborate it in much better way. Suppose my teacher asks me a question that what is smallest unit of data? I answer promptly “Bit”. This is the right and direct answer because I know it. If teacher asks me another question that what is the name of his neighbor? How can I know my teacher’s neighbor? Since I don’t know the name of neighbor hence I need to go and search his neighbor to ask his name or to see his neighbor’s name plate out of the house. This way search encourages knowledge, more searches more knowledge. Further in my Engineering education I had understood the meaning of research as recursive search. Means the search which motivates itself for more searches. Like previous example if I go to my teacher’s house to see his neighbor’s name then I would not only know the name but at the same time I would be able to acquire information regarding location of the house, level of hygiene near house, house number and all related information about the house which is considered as general awareness. Initially I had gone there just to see name however now I have much more information than initially required. This is the example and advantage of research. It also motivates itself to gather more relevant information.

One can have various methodologies to conduct a search. One can have various mediums to conduct the search as well. A Most important part of any research is literature review. For entire research process step by step progress can be observed only by this and outcome is incredible contribution to operational area. Throughout the course of this research, I intend to constantly and continually focus on the review of all existing literal in this field, so that I am inform to the largest extend about the various happenings in this field. This knowledge will hugely benefit the research as I will be aware about the working principles on this subject through regular extensive research. The process which is adapted for review the literature has many advantages. Of course understanding the subject area can be done only through literature review. After understanding subject area next stage comes to research problem. Here realization of research problem makes it more précised absorbable. In short there is step wise progressive path between research problem and knowledge area which is filled with random information. Comprehensive literature survey helps out researcher to reach out and discover the most optimal path.
A comprehensive literature review reveals all previous procedures which have been already explored. It adds value in the procedural methodology to make process simple. For example if a conducted survey is taken for further review than at that stage only it will known, how many problems have been faced and if possible it can guide for better solution. The stage can also guide us about the degree of genuineness of the procedure. So that we place our self at some better position to take a decision for methodological capability for the problem.

2.4 Sources of Literature Review

BOOKS
Books are always core of any research and show a path for further survey. During the course of this research work, we shall be going through a large magnitude of books that are related to ICTs, application of ICT and mechanism of SCM.

Advantage: Information available is authentic, relevant and of good quality and integration shows wide application. It can be only source for the detail and genuine information which would certainly provide the in depth knowledge of the subject and related ares.

Disadvantage: Some available information are quite old and although these are genuine but not very relevant and feasible for the experimentation.

JOURNALS
Most important advantage of the journal is it provides us the latest information about the topic. It also reveals the knowledge about the most recent research on the concerned topic. Another advantage of the journals is these are updated and provide us most relevant information about the topic. We are expected to refer Journals within the time line 1990-2011 which has also huge information about the research topic.

As books will also help us to find relevant National and International journals, conferences seminars proceedings or if required government gazettes.

E-journals/ E-books
Easy accessibility and approachability enables us to refer E-Journals. Since this is the time of global connectivity hence every researcher prefers to put their research on the net. After paying relevant and feasible amount for the journal it can be accessed through the net.
E-books are also to play a very significant role in research. It is like other traditional book but available online. Information retrieval and collection are very easy through this and since unlimited resources are there so we are likely to have a huge collection of E books which are available online. E books are easy to avail also through payment mode or many collections are available on line free of cost for research.

**Newspapers**

Since the area of research I have selected is very highlighted and related to public interest so information available in news papers is also very genuine and of my concern. So while conducting research on such a subject that is directly related to the future of this planet, newspapers also plays a significant role in information retrieval and finding international relations because it deal with the day to day business. It has another importance over the books or journals that it may consist some information of not only on national interest, but also at world level that a book may not contain. Weekly Times of India, Economics Times and Business Standard were few news papers which I had to refer while conducting research.

**Government Published Documents**

Government’s policies and decisions which have direct reflection on public interest or directly consumable items are of my concern. For example the approval of FDI in retail for multi brand will certainly enrich the ICT in SCM or RL.

**2.5 Research paper review report**

In above categories few Journals & Patents have been referred the summary of those reviews is as follows:

*Angelika et al. (2003)* in this paper authors highlight the significance of ICT enabling services. Closed loop supply chains are being used to recover assets that would be otherwise lost. ICT in closed loop Supply chain and management are being used and practiced. Authors also reveal that this mode of implementation has observed improvement in South East Asia especially countries like China, Japan, Korea India.
Angelika and Soulla (2011) here in the paper an index system for processing of center location in reverse logistics is discussed. With reflection of this a decision table is prepared. As subject a potential processing center is considered and the values of its index are taken as the condition which is the attributes of the table. These all values are continuous, hence these all are required to be put in discrete order to transform the decision table into an information system. The reason for this so as to use some rough set way on it. Further in the information system, a decision attribute for the object is created with respect to the location result of one potential processing center. Since set way based on distinguish matrix system so it was made associated and introduced to the information system.

Andera (2000) here author reveals the idea and usage of RFID 4(Radio frequency Identification) technique. RFID implementation can manage the recovery process more efficiently in Reverse Logistics & Supply Chain & Management. Author says a RFID tag can be assigned to each unit of product to identify it and subsequently delivery or recovery can be made easy.

Benabdel et al. (2011) in this paper a Decision support system (DSS) has been proposed. The domain which was considered is clinical waste. With the help of that Decision support system wastes (Clinical) were identified in form of threads. The system is developed with medical/Clinical wastes in centric idea. Paper concludes with hazardous nature to be taken care and adequate skill can implement DSS effectively.

Chang et al. (2008) here authors deals with the concept of achieving high agility in the domain of Reverse Logistics Enterprises. It may be an effective means for reduction in cost and meeting buffer needs of customer. It may also justify time, and robustness, production flexibility and relevant parameters. In summary authors try to elaborate high agility effect on reverse logistics and enterprises.

Cheng (2012) author presents here a comprehensive study based observation. There can be some uncertainty in remanufacturing which is called UMD. In green suitcase chain UMD can be used to predict the return demand model in the defined and flexible inventory model. These procedures were verified also in practical cases where uncertainty in reproducing the product of
observed. The paper concludes with the idea of proper coordination among all entities which are participating in recovery of product.

**Chunhong and Li (2011)** the authors present their ideas on the current scenario of logistics status in south East Asia especially in China. Recent research puts light on the relationship between and return logistics improvement and ICT (Information & Communication Technology) application in E- Business market. As the economic society grows up, pulls more revenue for the market people become more responsible towards this. It attracts more attention of the people to protect the environment protection. Significantly authors mention it that reverse logistics gradually attract the interest of people.

**Carsten N (1998)** here author starts with discussion on additional traffic on RL(Reverse Logistics) for electronic market and reference in Europe. It is also mentioned that how political and legislative willingness come forward to establish WEEE recycling system. Author also concludes that in any demographic area government policy may establish a benchmark in any technological development. It is also because of these policies only which may have impact on customer satisfaction which comes from quality offered by the manufacturer of the product.

**Guicheng and Xiuzhu (2010)** here in this paper the current development situation of E-Commerce in China is discussed. It further explains the rising era of RL (Reverse Logistics) in development phase in E-Commerce. Since the Reverse Logistics has very huge market in South Asian countries hence market of Chine is highlighted as a sample caseFinally authors elaborate and put light on the key of RL system function modules. Paper remarked as conclusion with the industrial aspects of the E-Commerce.

**Guicheng S et al. (2010)** the paper proposes a returned model in RL(Reverse Logistics ) to adopt optional policy to establish high efficient MIS(Management Information System) . Authors further mentioned that if management is matured then it will increase the volume of loyalty in its valued customers and this strategy may lead to great existence of loyalty customers which will produce ascending quality in RL.
**Jin and Xiong (2010)** the paper proposes a new returned RL (Reverse Logistics) model to adopt optional policy to establish high efficient MIS (Management Information System). Authors say lack of mature management methods and strategies will make great existence of lower loyalty customers, result ascending quality of RL. This may harm the reputation of the organization which offers product. Hence to pull up the strength of loyal customers organizations need to very mature in management.

**James (1998)** here authors reveal the fact that Individual firms have very important role as an entity and in supply chains it will continue to encourage all related firms to achieve competitive advantages. In future supply chain strategies RL (Reverse Logistics) will be an increasing path way as in present it acts as an important part. It behaves firms to be on the leading edge of RL strategies process development.

**Jiang (2012)** author presents an IS (Information System) model as application of GIS (Geographical Information System). It designs scheme of E-Waste RL, RLIS (Reverse Logistics Information System) based on internet It is a multifunction model to analyze E-waste flow. Ultimately the waste will be an important factor for revenue generation.

**JMan and Shao (2009)** here authors propose an indexing system for RL (Reverse Logistics) processing centre location. It corresponds to a decision table where several potential processing centers are identified. Values of index table correspond to conditional attribute of the table. This system is a typical example of data ware housing and then subsequently data mining operation.

**Jia et al. (2009)** although author Jia L has already explored the design of RLMS (Reverse Logistics Management Information System) in 3 modules ie. Functional, logical and security modules in research of RLMIS based on B/S+ C/S. In addition here authors have extended and detailed realization methods of RLIS (Reverse Logistics Information System) under E-commerce environment.

**Liu and Wang (2010)** 0-1MILP arithmetic is implemented to resolve distribution centre location problem in Reverse Logistics and management. Reverse Logistics location and management
structure in E-Business deals with degree of complexity in system, notion of objective divergence in system, bad balance in SCM (Supply Chain & Management) and much too little orientation.

**Reza (2010)** the role of third party becomes important when multiple dual factors are available. Here this research paper deals with a model. This model may recommend some strategy to select third party Reverse Logistics. A numerical example has been taken to demonstrate the process. It can be preceded with the help of DEA model. Simultaneously it allows the functionality of multiple dual factors. 3PL is core entity in Supply Chain & Management system.

**Ren et al. (2009)** authors propos a mathematical model for the data fusion which comes from location characteristics parameters TOA (Time of Arrival) of mobile terminal with respect to base terminal. The model suggested is developed and tested with in the domain of operational research.

**Ryan M Sarah et al (2003)** In this paper authors reveal the results of experimental study of improvement in scalability in Reverse Logistics e-Commerce. There are certain parameters like providing information to may improve scalability in online. the concerned users, limiting bidding opportunity may scale up the online auctions. Experiments were designed to see the impact of trading opportunities and try to discover the knowledge on the basis of past records of the participants.

**Sibo (2012)** author proposes an efficient design of a RL (Reverse Logistics) network. It has an algorithm based on the technique of parallel GA (Genetic Algorithm) where the profit is made objective function. Genetic algorithm is explored with neural network where we have facility to make system intelligent.

**Sheub C Dennis et al. (2002)** authors suggested a model in Reverse logistics which is recommended for third party providers in entry. It can be considered as a logical model which makes the product recovery and utilization technique more efficient. The model works on the application of Information and Communication Technology.
Teresa M McCarthy et al. (2002) authors try to put light on the path that goes to economy through E-commerce. Characteristics of E-commerce and its impact on supply chain and management is discussed here in this paper. The process of product recovery is also being discussed as a component of ICT tools application in Supply Chain and Management.

Vernon H C et al. (2001) this article describes market behavior and technological approach in Supply Chain Management and Reverse Logistics. It has an advantage of controlling and monitoring from centralized system which becomes efficient after executing with total coordination among all entities of product recovery.

Xiang et al. (2011) here authors discuss an intelligent model which is able to take decision. The machine has capability to take decision and hence called an expert system and an intelligent system. The application domain for these expert systems is not limited. The model is proposed for reverse logistics. The domain which is selected is E business. As assumption is also made with this model. The two significant logical entities which are demand and return to be determined by optional policy. It serves as a platform for the construction of information in reverse logistics as the exponential growth of E-commerce is observed. Even in forecast the model can behave like an intelligent machine.

Yang et al. (2011) authors focus on use of RFID (Radio Frequency Identification) technology to build RLS (Reverse Logistics System) design. RFID is one of the tools of ICT(Information & Communication Technology) which has been used very extensively even in retail stores. One can see this tool’s utility in shopping malls and big retail store. It certainly reduces the efforts of human and makes the process a bit faster. It further put light on ideas like RL and E-Commerce. RL in two modes returning and recovering, brand E-Business environment and information tracking system. In modern age at the bill counters of retail mega stores the above techniques are used at large scale. Here the real life application can be observed.

Zhao et al. (2010) authors have framed paper to discuss mainly three design modules. First is RL system function model, second is RL logic structure and third is RL safety issues. All the
three modules are incorporated to make it efficient to function. After this a note was also made on the procedure how to realize Management Information System (MIS) in reverse logistics.

**Zhu (2008)** author discusses an information management solution called UML in Reverse Logistics. UML, XML, EDI etc are tools in ICT (Information and Communication Technology) and NCT (Network and Communication Technology) which have been very useful to make the RL process mechanical and computerized. Two important functionalities of ICT are creation of Knowledge and retrieval of information from huge database. Actually the real challenge is data retrieval from the database system. It is very easy to collect data and create database. It does not require any specific methodology unless we define some algorithm to input data and maintain an order to store it. After processing when data becomes information, then it becomes useful for some defined task and then one needs to have a well define algorithm to retrieve the information to meet said goal. Hence author proposes an information management solution called UML (Unified Modeling Language) for information retrieval from the huge database.

**Patents:**

*A Wood et al. (2005)* in a peer to peer network in computer technology an implementation of database and management system was observed and synchronization also took place. It has sharing and distributed group of computer users. In distributed group or community the history of database was synchronized thoroughly. It was achieved by an object which was synchronized. The defined object consisting of the history data about. Whenever any change or addition takes place in specific record that synchronized object points it out. There is a routing agent which receives any time the synchronized object as information through transmission by any local computer user synchronized object. On the other hand the synchronized object is also transmitted in return to any remote computer user. This transmission takes place within the same sharing or distributed group.

*Joe (2005)* an online system and method of inquiring and tracking the status of an order which is placed online for a specific product. It is provided by the user to system. This specific system has a consumer status query message, which includes a consumer identifier of a user who previously placed the online order for the product. A status translator is operable to receive the
consumer status query message and convert the consumer status query message to a consumer status query file.

**Karl and Kangeneck (2000)** inventor has proposed a system for retrieval of information and indexing of information. A method is also discussed which deals with the key words. It has protocol to allot mark in terms of weights to certain key words and allow key words pairs to have relative values. It forms a matrix of the form KxK. For the analysis the database is considered where it was put on continuous observation that how many times the document has shown occurrence or co-occurrence. For this query response was also observed. Both the parameters ie weights which were associated with keywords and relative relation for further processing. These values may suggest further alternative or additional key words. These suggested keywords helped to find the relevant document in the data base. There is also a ranking methodology for finding documents which was evaluated with the observed number of hits and their relative areas.

**Lawrence et al. (2002)** the invention is directed to an enterprise management integration tool for providing a centralized repository for storage and processing of information related to the execution of the enterprise management functions. This is accomplished through the use of a Relational Database Management System (RDBMS) and specific database schema that model the enterprise components and services being managed. The interface with this database will be in one of two preferred forms: (1) software bridges to specific management applications; (2) standardized Structured Query Language (SQL) to applications that support the use of SQL. The database-centric approach provides a framework for integration of myriad applications (software programs) based on the needs of the enterprise management personnel.

**Kenneth (2003)** a vehicle control system for a vehicle having a door lock actuator includes a remote keyless entry (RKE) system including an RKE transmitter carried by a user, an RKE receiver at the vehicle, and an RKE controller connected to the RKE receiver for selectively operating the door lock actuator based on signals from the RKE transmitter. A piggyback controller at the vehicle is connected to the door lock actuator for performing at least one desired piggyback control function based on selective operation of the door lock actuator by the RKE
controller. The piggyback controller may switch to a feature programming mode based on selective operation of the door lock actuator. When in the feature programming mode, the piggyback controller may permit feature selection also based on selective operation of the door lock actuator.