CHAPTER VII

Summary, Findings,
India has leapfrogged into the league of nations that shape current global business. The nation is now at the cusp of entering the pantheon of developed countries, thanks to the farsighted policies maintained by successful governments since the liberalization drive. India’s inherent strength to hold its own in this highly competitive environment are is workforce, which is extremely proficient in the use of modern technology. Technology has permeated into every sphere of business and those who do not keep up with the latest advancements are left behind in the rat race for the consumer mind space.

Supply chain management and logistics are areas where the influence of advanced technology is omnipresent. In the past, logistics was a simple function of transportation of goods from an origin to a destination. Now, it involves high-tech
trucks and trawlers that are mapped onto a Global Positioning System with practices of cross docking to reduce the overall transportation costs.

Similarly, Supply Chain Management which was just an extension of the purchasing function earlier, has now grown into a discipline on its own where millions of SKUs are managed globally with real time inputs from across the supply chain, integrated through advanced database management software and ERP packages. From the days of manually counting, each and every unit transported and sold, modern business now uses RFIDs that act as individual “fingerprints” for any tagged product on the earth.

This research study was taken up with seven objectives which are listed below.

- To study the history of VMI in the Indian and international scenario.

- To compare the traditional inventory system with the VMI system.

- To evaluate the key performance indicators in the implementation of VMI in Indian retail sector.

- To identify the challenges faced while implementing VMI with focus on retailing.

- To understand the major changes brought about by RFID implementations in Indian retail outlets.
• To suggest strategies for effective implementation of VMI in Indian retail industry.

• To understand the factors that decide the success and failure of VMI implementation in Indian retail.

The findings related to each of these objectives are explained below.

### 7.1 History of VMI in the international & Indian scenario.

The researcher has in detail traced the history of inventory management starting from the post World War II days leading to the influx of several Japanese concepts popularized by the Toyota Production System, namely kanban, kaizen, jidoka, ishikawa, lean production, unit load concept and JIT. The success of JIT led to the birth of several other concepts like Postponement and JIT II or Lance Dixon Bose Configuration.

JIT II was the innovation that came closest to VMI. It empowered the supplier to post an employee inside the buyer’s production facility and write his own purchase order, thus giving complete freedom to the supplier to make key decisions about the supplied product. The need for further streamlining of the SCM function led to Flexible Manufacturing System, 3rd Party and 4th Party Logistics service providers.

The retailer, Wal-Mart and its supplier, the FMCG major Proctor & Gamble introduced the pioneering experiment called Vendor Managed Inventory around 25 years ago on their product line of disposable diapers. The success of that venture led
to more retailers joining the VMI bandwagon. Wal-Mart has improved their VMI arrangement to such an extent that all their major suppliers are contractually expected to enter into the arrangement to have a long standing business association with the retail giant.

The researcher has elucidated examples of VMI implementations by retailers like K Mart, Dillard Department Stores, JC Penney, Grand Union, Fred Meyer, wholesalers like ACE Hardware, electrical component manufacturer Panduit, semiconductor giant Motorola, an OEM Celestica, Boeing Skin & Spar's association with its supplier Alcoa, a water cooler retailer Elkay and an industrial furniture manufacturer Herman Miller.

In India, experiments with VMI/RFID implementations were conducted by automobile companies like Maruti Udyog Limited and Mahindra & Mahindra Limited, manufacturers like Madura Garments, Marico Industries, Ranbaxy Labs, Pfizer Laboratories, retailers like Pantaloon, Future Group and Shoppers' Stop and even public services like Airport Authority of India. The major software companies like Infosys Technologies, Wipro Technologies, Mahindra Satyam and Tata Consultancy Services offer technical support for the implementations.

The above examples clearly highlight that VMI and RFID are seriously gaining acceptance in modern SCM, with all the major players across sectors being involved in the implementations.

7.2 Comparison of the traditional inventory system with the VMI system
In the traditional inventory replenishment process, sales are forecasted using historical sales data. The retailer or customer tracks inventory and sales figures using information of on-hand items and forecasts the order. The purchase officials observe the ordered data and “pushes” the items they are responsible for. The created purchase order is communicated to the vendor. The vendor assesses the inventory position and determines whether the order can be fulfilled or not. If the order is available at the vendor site, an Advanced Shipping Notice is communicated to the retailer warehouse or store and the product is shipped. The vendor sends the invoice for the order to the retailer. Upon receiving the product, the retailer does the invoice matching and handles the payment through their accounts department.

In the VMI replenishment process, the forecasting and creating of purchase orders are done by the vendor/manufacturer rather than the retailer. Electronic Data Interchange and RFIDs take a prominent place in the communication systems in a VMI arrangement. The retailer updates the inventory and sales position regarding the product of the vendor or manufacturer in real time using the EDI or any other B2B arrangement set up by them in collaboration. The supplier creates the purchase orders based on the established inventory levels and fill rates. The retailer is freed from the activities of forecasting and creating purchase orders. The vendor takes responsibility of maintaining the stock plan of the retailer, vis-a-vis the vendor's product. The vendor sends the shipment notices before sending the product. The invoice follows the shipment notice. Upon receipt of the product, the retailer handles the payment through its accounts department.
This clearly explains the shift in the inventory management of a product from the retailer to the vendor. Modern technology has facilitated the genesis of such an arrangement. Vital to the success of this arrangement is the existence of a real-time link between the supplier-retailer & a contractual arrangement based on mutual trust and cooperation for optimal functioning of the entire supply chain rather than solely focusing on profits for the individual units.

The next section deals with the key performance indicators in VMI/RFID implementations that were identified through surveys and discussions during the study.

7.3 Identification of the key performance variables

The population of this study comprised of all stakeholders in the supply chain of the organized retail organizations in India. A judgment sample of 100 managers working in the supply chain of selected organized retail firms across India was taken. Manufacturers like Marico Industries, Hindustan Unilever Limited & Godrej as well as retail giants like Future Group’s Big Bazaar & Shoppers Stop were classified under the category “Big” and other retail players like Subhiksha Retail, Vishal Megamart, Reliance Fresh, More, Heritage Fresh, E Zone & Viveks Retail were classified under “Small” category based on the criteria of their product range and floor area covered. The representatives of manufacturers, intermediaries and retailers were also given the questionnaire schedules for their responses.
Major findings from the survey are as follows:

1) There is extensive usage of IT and related technologies in the Indian retail sector for SCM and Inventory management.

2) The main areas where they are applied are:
   i. Generating demand forecasts
   ii. Checking finished goods inventory levels
   iii. Checking vendor performance history
   iv. Accessing inventory database
   v. Synchronizing with supply chain partners

3) Above 70% of the firm surveyed use IT and related technologies to manage the inventory functions on a day to day basis. The ones who use it to a lesser degree are small retailers who follow local procurement practices, have lesser investment in IT infrastructure, rely more on manual systems of calculations and telephones for communication.

4) The Chi Square analysis revealed that there is a strong association between the size of the firm and the usage of IT in the functions of order generation and forecasting.

5) It was found that majority of the retailers and other supply chain partners still use the barcode scanner as the stock keeping tool. Email, online chats and telephones are still the common communication links to convey the inventory requirements of smaller players.
6) Major retailers who deal with larger number of SKUs have all started shifting to RFID based stock keeping and inventory accounting. EDI arrangements with dedicated lines to most preferred suppliers exist and an ERP based system acts as the decision support for the entire supply chain. Big retailers also have their own fleet of high-tech vehicles or they even pool the usage to reduce costs.

7) Except for the use of barcode scanners, it was found through the Chi Square analysis that size of the firm has an association with the introduction of new technologies to synchronize with supply chain partners.

8) The researcher also analysed the major irregularities that cropped up repeatedly in their supply chains. They were found to be
   
   i. Unpredictability of the orders
   
   ii. Increase in the lead time in responding to the market
   
   iii. Difficulty in synchronizing demand and supply
   
   iv. Occurrence of Stock-outs and Back-orders
   
   v. Over-ordering to hedge against uncertainty

9) Smaller firms report lesser occurrence of orders becoming unpredictable due to lower scale of operations.

10) The Chi Square analysis revealed that there is no significant relationship between the size of the firm and an increase in the lead time in responding to the market.

11) There is no significant relationship between the size of a firm and its chance of having demand-supply synchronization difficulties in its supply chain.
Errors in forecasting amplify through the supply chain by the bullwhip effect. The only solution is to reduce the error at the stage where customer demand is calculated. Retail stores are the entities closest to the customer and if the demand capture at that stage is accurate, the errors do not get amplified throughout the supply chain.

12) There is no significant relationship between the size of the firm and the chances of occurrences of stock-outs and backorders in the supply chain. This means that a wrong forecast at the consumer level in a big or a small firm will in all probability get amplified across the supply chain and result in a stock out or a backorder or even in some cases over ordering.

13) There is no significant relationship between the size of a firm and the chances of occurrence of over ordering to hedge against uncertainties of demand in the market.

14) RFID implementations have started in 31 firms out of the 100 firms surveyed and more than 50% reported that results were positive and encouraging. It was reported that the RFID implementations have led to the following results:

a) Reduced Supply chain costs
b) Improved Product safety and traceability
c) Increased Shelf availability
d) Improved Supply Chain Responsiveness
e) Improved Store Operations
f) Improved Information Sharing
g) Improved Product Differentiation and Enhancement

h) Builds Consumer Value

i) Helps the marketing function & in store promotions

The retail supply chain stakeholders were asked to give their perceptive evaluation on the probable impact of VMI/RFID implementations on the Indian retails in future. Out of the tabulated responses 69 respondents were of the opinion that they were either in the planning stages of the implementations or had not yet taken up the implementation decision.

However, the 31 who responded opined that VMI/RFID implementations will show the following results

i. Improve retail store operations

ii. Improve the retail scenario in India in future

iii. Prove to be a long term value for money investment if persisted with.

iv. Improve visibility of products which in turn will improve demand forecasting and result in better product availability to create satisfied customers.

v. Improve supply chain coordination

vi. Require tech savvy youngsters for the retail jobs

vii. Have a snowballing effect with more supply chain partners taking up the initiative and joining the VMI/RFID arrangements to reap greater benefits.

The retail operations and inventory management at the two automobile firms and four retail organizations were studied as case studies and the stakeholders
revealed a lot of insights into the challenges faced in the implementation of VMI/RFID systems.

**The following factors were identified as crucial for measuring the success or failure of the VMI system**

a) Pure Metrics like Distributor Stock out percentage, excess Stocks and Accuracy of Forecasts.

b) Derived Metrics like Estimated secondary loss of sales and estimated primary loss of sales

c) Other measures like cost of misdistribution, cost of old stocks remaining in the supply chain and also overall supply chain costs were also considered.

**7.4 Challenges faced while implementing VMI/RFID systems**

The following challenges faced by the companies that implemented or were in the implementation stages of VMI and RFID systems in Indian retail were identified, while in the implementation stage.

1) FMCG retailers are found to be very reluctant to share information across the supply chain unless the entire system is under the control of one system. The biggest requirements for the success of VMI implementations are trust and a
mutual partnership agreement among the supply chain stakeholders, that works for the improvement of the whole supply chain instead of trying for individual profits.

2) There are great differences in the work ethics of organizational cultures and degree of transparency in the dealings of different stakeholders in the supply chain. This makes it very difficult to have an inter-organizational system that is seamless and has acceptance across the supply chain.

3) Some software solutions providers built the VMI module separately from the existing ERP application in place, thus creating a problem with proper integration of the two systems. The entire ERP operations have to be tweaked to seamlessly integrate the VMI operations into the scheme of things for it to be successful and also to reflect the changes as and when it occurs.

4) There are opinions that improperly implemented VMI simply transfers the ownership and costs rather than attaining the aim of reducing the cost across the supply chain.

5) A lot of business time is lost in the testing and validation of the EDI data and standardisation of protocols of the systems used between different organizations that are part of the supply chain.

6) Many retailers and suppliers have cited a lot of impatience in waiting for the expected results. Initially there was high degree of expectations about the
speed of results of such a business process reengineering effort, but in due course, organizations became impatient with the slow results.

7) Some companies are still sceptical and secretly employ the traditional methods of replenishing inventory.

8) Vendors who follow traditional methods with the retailers are doubtful and a little pessimistic about the priority services given to VMI.

9) In most cases there was a lack of clarity over what could be done with the ordering errors.

10) Many employees are not aware due to lack of effective communication about the new system of managing inventory using VMI.

11) Even though the costs of planning & forecasting of inventory has been shifted to the supplier, there is still no clarity on the accountability and compensation for the losses incurred due to forecast errors.

12) Special pricing schemes & promotion schemes which are devised seasonally or suddenly to boost sales in the short term send the VMI forecasting haywire and systems need to be in place to incorporate them in the system.

13) Since the initial costs of forecasting & planning are shifted up the supply chain towards the supplier, there are lot of disagreements as to the
percentages of profits and the method of apportioning them across the supply chain.

14) The degree to which confidential data can be shared across the supply chain is another grave issue. Holding back data may reduce the efficiency while releasing sensitive data may amount to compromising on a trade secret.

15) Minimum volume agreements & Exclusivity agreements with priority partners are difficult to incorporate into the VMI system which is implemented across the supply chain.

16) Pacifying the non-VMI suppliers who may feel short changed due to their inability to be a part of the high technology VMI network.

17) The retailers in many cases are forcing the suppliers & manufacturers to absorb the additional costs of tagging RFID onto the cases/products.

18) Manufacturers rarely report short-term gains after the RFID implementation. Short term gains are usually seen for the retailers, though in the long term both parties gain. This makes manufacturers and vendors slightly apprehensive of the technology.

19) Data synchronization, integration and lack of standards (even though the EPC Global acts as a standard) are major issues when used across countries.

20) Due to the nascent stage in the technology, the RFID technology is still not fully fool-proof and there are issues of electromagnetic interference and wrong reading being reported as the technology is still not fully perfected.
Metal and liquid can play havoc with RFID signals with the current technology available if not properly done.

21) There are fears that competitors may develop systems which can track a particular company’s shipments and inventory as vulnerabilities still exist in the security system as is the case with credit cards. Issues of whether customer data is safe with the retailer also arise.

22) The cost of an RFID tag in India is close to Re. 1 per tag. This is still prohibitive for a firm dealing in millions of SKUs a year. Major retailers like Future Group and Shoppers’ Stop still practice pallet or box tagging rather than tagging individual units. RFID implementation becomes fully effective only when individual units can be tagged. For this to happen, more RFID manufacturing units should come up in India based on more retailers adopting RFIDs. The increased usage will bring down the prices to a stage where it comes down to the acceptable and desired level of around 50-60 paise per RFID tag making it accessible even to a medium enterprise.

In spite of these challenges that were faced by the companies, major changes have been ushered in by the introduction of RFIDs in Indian retail sector. A few of them are mentioned in the next section.

7.5 Changes due to RFID implementations in Indian retail outlets
Radio-Frequency Identification Device (RFID) is an automatic identification device technology used to remotely store & retrieve data without actual scanning of the data source.

The data transmitted can provide identification information, location information, the product details like batch number, colour, date of purchase, shelf life, time on shelf till now, price, date of manufacture, time spent in transit, location of distribution centre, name of last person to hold the item along the supply chain among other details depending on the level of information required on the tag for different product categories. This has improved product traceability and global supply chain visibility exponentially.

The next section provide a brief of the findings related to the different factors that decide the success and failure of VMI/RFID implementations in Indian retail.

7.6 Factors that decide the success and failure of VMI implementation in Indian retail

The derived benefits perceived by both manufacturers and retailers who are either in the implementation stages or who have successfully implemented VMI are mentioned below:

7.6.1 Perceived Benefits to the Manufacturers

a) Supply chain operations become more streamlined as better partnerships are established & collaborations based on trust are formulated.
b) Better realization of the market situation due to better access to real time demand & inventory data across the supply chain.

c) Improvement in Service levels due to the right product being replenished at the right time in right quantity due to better visibility of the demand realities.

d) Savings in the costs of raw material and finished goods inventory due to lower investment in overall inventory.

e) Better promotional plans can be formulated at the strategic and operational levels due to improved visibility of product levels & inventory levels.

f) Obsolescence of the held inventory can be better controlled due to lesser amount of inventory held at the manufacturer level.

g) Prioritization of the production & replenishment can be done by checking the real time stock position. The traditional practice of routine replenishment can be discontinued improving the capacity utilization.

h) The accuracy of forecasts also goes up drastically with the advent of technology like RFID & POS data capture which aids VMI practices. This helps the manufacturer also to plan effectively for the replenishments.

i) The ordering errors at the distributor levels are also reduced considerably.
j) The lead-time in delivery of products by the manufacturers is also reduced drastically.

k) Even though initially firms experience a reduction in profits in the short run due to the new investments in technology & processes, in the long run the return on investment for the manufacturer increases.

7.6.2 Perceived Benefits to the Buyer

a) The cost of ordering, inventory planning & replenishments goes down drastically as the responsibilities of managing the inventory gets shifted further to the supplier or the manufacturer, thus enabling the retailer or buyer to concentrate more on the selling of the available stocks.

b) The costs of forecasting and purchasing functions are also transferred towards the supplier side of the supply chain.

c) There are reduced instances of stock outs, lower levels of inventory held, fill rates show improvement & there is higher inventory turnover in the buyer site.

d) Service levels go up due to better product availability for the customer.

e) The VMI arrangement usually is on a contract that the buyer will not be paying for the inventory until it has been sold or used as the responsibility of sending the quantity of supply is with the manufacturer & the forecasting done by them using the VMI system in place.
f) The buyer is able to relay the sudden changes in trends to the supplier or manufacturer.

g) Better product mixes can be planned considering the priorities at hand when compared to the earlier routine replenishment system.

h) Transfer costs or pipeline costs are also kept at the minimum as there are lesser inventories blocked up in the channels of distribution.

i) The extra costs of holding safety stocks are also brought down.

j) The data entry errors are also brought down considerably as VMI systems mostly use remote or automatic data capture techniques like bar code scanner, electronic smart trolleys and RFIDs for the tracking of consignment.

7.6.3 **Major Limitations to the success of the VMI programs**

a) There is an inherent lack of mutual trust between all concerned parties when the arrangement is taken up as it involves huge investment and changes in processes.

b) Introduction of the arrangement is seen as more of an experiment by the stakeholders rather than a reengineering exercise.

c) Absence of standardized implementations across the supply chain in many cases leads to improper data communication.
d) There is a lack of communication between management and stakeholders in many cases when such a big venture is taken up.

e) Non VMI vendors feel shortchanged with the arrangements as they are given an option of being forced into the arrangement or lose out on business for no fault of theirs.

f) Clarity on the accountability during initial stages of implementations when errors are inevitable is necessary for employees to feel comfortable.

g) Relatively high cost of RFID tags is still prohibitive for individual product tagging.

h) Lack of sufficient training sessions due to rushed implementations prove detrimental to the success of the program.

i) Lack of service standards and clarity on what to do in cases of exceptions also exists.

7.7 Recommendations

1) An understanding that short and long term results of implementation would be different in terms of revenue and profits is vital for it to gain acceptance. The managers expect a short-term reduction in sales in the initial stages but with its improved forecasting and planning capabilities in the long run the stocks at its distributors can be reduced resulting in a long term increase in sales revenue.
2) The emphasis during implementations should be on mutual trust and partnerships based on overall supply chain profits rather than individual stakeholder’s profits.

3) Clear contractual agreements regarding the degree of ownership of the supply chain management should be chalked out.

4) A relaxation of the tight purse strings by the retailer initially to support the supplier & manufacturer to get seamlessly integrated into the system is imperative as it has been generally found that the latter reaps benefits only in the long run while the retailer experiences benefits earlier.

5) Standardization of the protocols of EDI and other technologies used across the supply chain also has to be ensured for deriving the maximum value of this re-engineering exercise.

6) Clear communication to all the stakeholders and employees of the benefits, the intermediate lethargy and change management issues that will crop up during the implementations will go a long way in lending clarity to the necessity of this change.

7) Bringing on-board all the VMI and the non-VMI vendors to clarify any doubts of priority services being rendered to either parties will ensure more support from the non VMI vendors also.

8) To quell the high initial expectations from the re-engineering activities being undertaken expectation management becomes necessary.
9) Clarity on the problems that invariably crops up due to some forecasting errors and ordering errors in the initial transition stages needs to be communicated.

10) The relatively high cost of RFID implementation has kept the implementation levels to tagging cases rather than tagging individual units. More retail players need to awaken to the possibilities of improving their business practices and come forward to adopt VMI, so that higher manufacturing volumes will bring down the cost of tagging an RFID and make it accessible to all retailers, not just the giants.

11) Only realistic targets should be set during the initial stages of implementation, which can be revised periodically in a phased manner.

12) It should be clearly communicated to all stakeholders that the venture will not start yielding results in the short run as is the case for any large scale Business Process Reengineering program.

13) Before the actual implementation, elaborate simulation sessions & pilot implementations are to be repeatedly conducted till the attainment of perfection

14) Incentive programmes should be based on partnerships and the focus should be on contribution to the entire supply chain profits rather than individual volume & performance.
15) Well-defined contractual agreements on service standards that are to be adhered in the supply chain should be entered into by all the stakeholders.

16) In the event of exceptions in the functioning of the VMI arrangement, the course of action to be followed should be decided and communicated in the initial stages of the implementation itself.

7.8 Conclusion

The sharp acceleration in the purchasing power of the Indian consumer, who constitutes the youngest population worldwide, has led to the burgeoning of the Indian retail sector. The boom of the IT and service industries has resulted in skyrocketing salaries and greater disposable income in the hands of the Indian consumer, who is now spoilt for choices with the entry of all major foreign brands into the Indian retail scenario.

As the customers have easy access to a variety of products and services, the retailers are forced to develop innovative ways of providing services to the customer, to ensure maximum value for their money. Due to the stiff-neck competition in the retail sector, a stock-out or a back-order situation can pose a threat to a company in the form of a loss of its valuable customer. This situation highlights the importance of SCM in today’s world.
The improvements in the usage of IT and ITES in retailing through modern innovations like RFID and Vendor Managed Inventory have improved the management of a retail supply chain by leaps and bounds. These innovations help the retailer to tailor his offerings to the requirements of the customer. This study will provide valuable output and serve as a base for future studies on VMI and RFID implementations in Indian retail sector.

RFIDs enhance the visibility of a product across a supply chain and VMI empowers a supplier to manage the inventory of a retailer by capture of data at the customer end through EDI networks from the store. These innovations are aimed to improve the data capture at the consumer level thus improving the forecasting required for accurate supply of products.

The technology and its usage are still in its nascence and the progressive adoption of these technologies coupled with the lessons learnt from implementations will help retailers improve the existing system and streamline future implementations.