CHAPTER 3

REVIEW OF LITERATURE
3. REVIEW OF LITERATURE

There is ample literature available on supply chain management but very little work has been done on the supply chain of perishable food products. In this work, the researcher has tried to gather and extract information on various areas of supply chain as well as retailing and has tried to compile them to prepare a base for this research.

Tom Devis in his article ‘Effective supply chain management’ {Sloan management Review/Summer 1993} says that in a time of shortening product life cycle, complex corporate joint ventures and stiffening requirement for customer service, it is necessary to consider the complete scope of supply chain management, from supplier of raw materials, through factories and warehouses, to demand in a store for a finished product”.

Demeter & Gelei in their article advocate about the extension of coordination and integration of value creating processes. They also define that there are three types of SCM models: 1) Transaction dominated 2) Internally integrated & 3) Externally integrated. After analyzing these models in Indian perspective it can be said that unorganized retail sector falls under the first model where as the organized retail sector fulfilling the criteria mentioned in second model (i.e. Internally Integrated) and in some cases i.e. partially it also fulfills few criteria of the third model (i.e. Externally integrated). Here it is quite relevant to mention that very small numbers of organized retail companies are externally integrated (For e.g. Wal-Mart) whose automatic replenishment system is highly shared by their suppliers/manufacturers.

The author also opines that although there is a historical development path from transaction dominated to externally integrated companies- all the three models are equally viable operating models in appropriate environment. The smaller and second and third tier companies will never reach and never should reach the level of externally integrated companies, since the huge investment in information system or in relation will never return.
S. Sudeesh & Rama Rao in their research titled ‘Managing supply chain performance with collaborative knowledge sharing between supply chain partners’ suggest that the concept of SCM emerged as manufacturers experimented with strategic partnerships with immediate suppliers. The short term objective of SCM is to increase productivity and reduce inventory and cycle time, a long run strategic goal is to increase customer satisfaction and profits for all members of an organization.

Retailing industry focuses on a different aspect of SCM, that is location and logistics issues are more often than transformation. A supply chain can reduce its inventory efficiently redistributing its stock within the supply chain (Davis 1993).

The role of supply chain management is seen as an important element in the strategy (Fuller et.al. 1993). The IT enabled logistics management not only enhances the quality of products and services but also reduces operating costs, eliminates wastage, optimum utilization of available resources and also able to provide mechanism to collect and store huge amount of data for decision making.

Professor N. Vishwanadham⁹, discussed in his research paper that two important problems with the Indian rural economy have been inability to manage the complexities involved in transition of the food and agriculture sector from a supply driven value chain to a more market orient ed, demand-led value chain, and the failure to ensure growth with equity or inclusion of all stakeholders in the growth process in agriculture.

Laurel Evelyn Dyson and Susan Koruth discussed in their paper titled “Improving business performance through supply chain Intelligence: An Australian Perspective” about the benefit and challenges of implementing supply chain intelligence where they viewed organizations around the world are increasingly becoming aware of the fact that competitive success depends on how well a supply chain works in delivering value to customer

⁹ Food And retail Chains In India, ISAS working Paper No. 15- 06 Oct. 2006
by supply chain Intelligence used as a tool, derived from data warehousing technology and enables the partners of supply chain to collaborate by providing visibility of information and online analytical capability across the chain. Globalization, customer demand, complexities in business environment and the availability of new technology are all driving companies to adopt supply chain Intelligence\textsuperscript{10}.

3.1 THE WHEEL OF RETAILING

There are number of theories which attempt to explain the evolution of retail enterprises and wheel of retailing is probably the most well known and oldest method for explaining the patterns of competitive development and changes in retailing. The model developed by Malcolm McNair at Harvard university, in which it can be seen, how new businesses tend to enter the market as fairly low status, low margin and low price operators. This limited positioning and strategy permits them to compete quite successfully with the larger and well established rivals. Over the time, the new arrivals gradually meet with some success and acquire more sophisticated and elaborate facilities. Clearly, this requires a greater investment and leads to subsequent rise in the individual retailer’s operating costs. The more established businesses are thus forced to raise their prices and operating margins. Actions such as these make the companies vulnerable to a new entrant and low margin retailers, who then compete and progress through the same or similar pattern. \textit{(Newman & Cullen, 2007; pp67)}.

Some Facts About Organized & Unorganized Retail

The Wall Street Journal reports say (Refer: livemint.Com), small stores, also called *kirana* stores, will continue to grow alongside organized retail, albeit at a slower rate, and it might be a decade before such store owners lose business to the big retailers, providing an ample window for India to help make the smaller players part of the transition in retailing. When the share of organized retail in food reaches 30%, small retailers will be hit. That may happen in one or two decades. The consumers and farmers will be the early beneficiaries of modern retail, and that to ensure that traditional retailers don’t lose out at once, they need to be included either by co-opting them or helping them find alternative jobs.

A study has been conducted by Thomas Reardon of Michigan State University and Ashok Gulati of the International Food Policy Research Institute, which subsequently became part of a Union government-commissioned study by the Indian Council for Research on International Economic Relations (ICRIER) on the impact of the growth of organized retail on unorganized retail. The paper, “The Rise of Supermarkets and Their Development Implications” draws on experiences from the growth of organized retail in other developing countries to suggest what the impact of organized retail will be on consumers, farmers and smaller retailers in India. The ICRIER study showed that 50% of small retailers surveyed reported lower sales and 61% of all retailers pointed to competition from organized retail as reason for their declining financial health. The study surveyed 1,598 small retailers, of which 793 were located close to large retailers and 835 were in neighbourhood without large retailers.

Those in head to head competition said that sales were down 16% and those in safe neighbourhood where there were no big retail outlets said that sales were up 2%, suggesting that organized retail had affected the business of small retailers.
Experiences in China and Indonesia suggest that both kirana stores and organized retail outlets can co-exist, although they will grow at varying rates. However, structural changes in retail will surely start affecting large numbers of small retailers at some stage, be it after one or two decades, especially when the overall share of organized retail in food reaches about 25-30%\textsuperscript{11} (Reardon et al. 2007). Until then, organized retail could grow at 20-40%. Kirana could grow at 2-5%. While just 1% of all food and grocery sold in the country is through organized retail stores, the business is growing at a rate of around 30%, according to a report by Man Financial, a Mumbai based brokerage. Several large retailers, including Wal-Mart Stores Inc, Reliance Industries Ltd. and the Aditya Birla Group have big plans for selling everything from food items to furniture in organized retail. Meanwhile, there have been increasingly strident protests against big retail. India has more than 12 million small retail outlets making it hard for the government to ignore any threat to the livelihood of this large base.

However, traditional retail is typically in need of modernization and the Indian government needs to invest in this, the way governments in Singapore, Hong Kong and Taiwan have done to overhaul the system, say in the case of modern wet markets, according to Reardon’s report. It also says that organized retail is a growing source of taxes to the government, which can be ploughed back to modernize traditional retail and build infrastructure to modernize the food supply chain.

Adding yet another conflicting data point to the simmering controversy of whether organized retail will benefit or hurt the average Indian, credit rating agency CRISIL has come out with a report saying that around Rs 1 trillion worth of food is not being used in the country because of wastage, poor storage and middlemen commission costs.

This wastage may occur in the form of food simply rotting or not getting its full market price because of gaps in the current food supply chain. The

\textsuperscript{11}Dr. Thomas Reardon and Dr. Ashok Gulati, the Co-Directors of IFPRI/MSU joint programme on “Markets in Asia” who were invited by ICRIER to be partners in study of ICRIER Report, May 2008.
emergence of organized retail will only strengthen the supply chain, increase farm incomes and reduce food spend for consumers.

Food and grocery sales are just 18% of organized retail revenues. But with many new players, including Reliance Industries Ltd, the Aditya Birla group and Bharti Enterprises setting up retail operations, food and grocery retail could form 25% of revenues for organized retail. This could bring wastage down from the current level of 25% to 15%, which is as much as, that is wasted in more developed retail environments. That could then boost farm incomes by as much as 37% and reduce the country’s food spending by 3.5%. (ICRIER Report, 2008).

Ajay Dwivedi, director, Crisil Research expresses that there are less layers and less wastage of food in organized retail. The findings of the report come against the backdrop of the Left parties asking for regulations to curb organized retail as they believe that the shift to organized retailing could lead to an elimination of jobs in the unorganized retail. After agriculture, retail sector is India’s second largest employer. Faced with such concerns, the government has commissioned a study on the impact of organized retail on unorganized retail, by the Indian Council for Research on International Economic Relations.

Reena Desai, campaign director of the FDI Watch campaign, which opposes opening up India’s retail sector to domestic and foreign organized retailers; says that enough evidence is not available to show the extent of wastage caused by middlemen. Many livelihoods would be lost where these companies are entering. Besides, there are also implications of having a few companies controlling the entire supply chain of food.

Currently, a very small percentage of food and grocery is sold in an organized retail environment. But, with organized retailers increasing their presence and consumers’ shopping habits changing, food and grocery retail in an organized set-up will grow at 37% over the next five years, compared to 26% for the entire industry.
In the food and grocery section across hypermarket, supermarket, and discount store formats, grocery covers around 45 per cent of store space in FMCG and staple food products. The profit margin in FMCG products is tight because large suppliers control the brand power and store shelf space at local neighbourhood stores. In staples and lesser-known FMCG products, however, retailers gain 13 per cent profit margin on the cost price. In the absence of national brands in staple food products, store branded private labels are becoming popular and fetch up to 12 per cent average margin. As regards fresh fruit and vegetables, however the store level penetration is low compared to other categories for various reasons: (i) high wastage; (ii) lack of temperature-controlled vehicles; and (iii) low profit margins in bulk produce (potatoes, tomatoes, and onions). In addition, the customer adoption rate is also low in fresh fruit and vegetables because of its daily need-based requirement and the distance factor. Nevertheless, fruit and seasonal vegetables are higher profit-margin produce. Fruits sell at 40 per cent margin on the cost price, and seasonal and exotic vegetables around 30 per cent above the cost price. Across the fruit and vegetable section, the net profit gain is between 8 per cent and 10 per cent on an average. As a result, organized retail firms are strategizing convenience format stores up to 2,000 sq. ft. area in order to penetrate the local neighbourhood markets. (ICRIER Report, 2008).

**Indian Retail Environment**

Indian retail market has around 12 million outlets and it is the largest retail outlet density in the world. However it has 94% unorganized retail market (CII - Mckinsey, 2008). Market is controlled by a handful of distributors and wholesalers. Traditionally the retail business is run by small convenient stores, having shop in the front and house at the back. More than 99% retailers function in less than 500 square feet. Most of these outlets have very basic offerings, fixed prices and no ambience. These are highly competitive stores due to cheap land prices and labour. Also, these stores avoid the taxes as they belong to a small industry sector (Banerjee, 2004).
Generally the accounts of trading are not maintained separately. The educational qualification level of these retailers is low. Information Technology is, as if, unimportant for the stores, due to its small size and small business. But due to the poor inventory management in the lower tiers, the upper tiers and finally the end consumers have to suffer in terms of demand invisibility and transferred cost respectively.

**New Development of Organized Retail**

Sustained GDP growth rate in the last 10 years has already created a base of over 30 million consumers. Current economic indicators seem favourable, and if a GDP growth rate of 6-7% can be maintained, a 64 million affluent consumer base is possible by 2015 (CII - Mckinsey, 2008).

![High growth potential in Organized Retailing](image)

Source and Estimates: Morgan Stanley Research.

Fig-3.1

Now, with the Government considering opening the Foreign Direct Investments (FDIs) in retail sector, the entry of multi-national retail chains would change the entire retail scenario of the country. As per the “National Council of Applied Economic Research” (NCAER), almost 40 percent of India’s high income urban population accounts for the 20-25 largest cities with a population of more than one million. Therefore, most retail formats in
these markets would be seeing a change from Small Enterprise to the Super centres (Sinha, Banerjee, 2004).

Food sales constitute a high proportion of total retail sales. The share was 62.7% in 2003 and was worth approximately Rs 7,039.2 billion. Other segments having high or substantial share in Indian retail include the apparel and the electronic sector.

**Healthy Signs for Organized Retail Business**

In the year 2008, the consumer spending had gone up by 9.6 per cent compared to the previous year. The growth in 2008 implies a rise in market opportunity for retailers, estimated to be in the range of 150 billion Rupees, among the upper and middle class categories, in urban India alone and ranked first for retail investment with GRDI score 68.(AT Kearney GRDI, 2009).

Earlier, consumers used to look for value for money first, with quality being the second decision parameter. But nowadays, due to branding and exposure to media, consumers look first at the quality of products and then look for the value for money. Hence business with big suppliers providing the branded merchandise will spring up more (Kinra, 1995). Information Technology, Quality Control, Training and streamlining operations to improve efficiencies are becoming the focus areas for industry assortment, innovation and planning for customer retention. Rural India is also offering opportunities for retailers with increase annual income of $2000 per household accepted as a point at which consumers start buying quality and brand. (AT Kearney GRDI, 2009).
3.2 CONSUMER PSYCHOLOGY

The majority of middle class Indian consumers are wary of large retail formats with well-stocked shelves (Aggarwal, Singh, 2004). These outlets are considered to have overpriced goods, even though they sell at the government mandate Maximum Retail Price (MRP). Smaller stores often stay open beyond normal working hours and work on low margins because they employ cheap labour and have lower overheads. Such outlets attract customers in large numbers. Also, consumers have the notion that large shops spend on promoting themselves and pass on the cost to the consumer. Retail format should be one of the factors which should be taken into consideration since; this is one of the reasons for failure of Wal-Mart in Indonesia (Robert Slator, 2002).

Customer needs are core to retail marketing. Many retail marketers stumble in the marketing game because of their obsession with the products that they want to sell and ignorance of the needs that the customers want to satisfy. Marketers survive and prosper not by producing and selling goods and services, but by developing and offering need satisfaction.

Retail managers should be aware that strategic management in their businesses is different that employed in manufacturing businesses. The strategy is often viewed either from product or service perspective, despite the fact that such a perspective may not be appropriate for retail business. The managers must bear in mind the uniqueness of retail businesses while evolving and implementing strategy.

Indian consumers are evolving and their mindsets as well as attitudes witnessed a steep change since opening of the economy and consumerism. Consumer behaviour has seen a sea change. Over the years the retail landscape has undergone a metamorphosis.
Evolving consumer preferences!

Indian consumers are evolving...

• From traditional to...
  ... modernized traditional

• From globalize to...
  ... Indianise

• From functional to...
  ... lifestyle

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**Buying Behaviour**

Traditionally, the housewives handles the procurement of groceries in any house, and she is the prime decision maker. Majority of the times, the customers are loyal to the retailer, if no particular incentive is available in [27]
any other shop. The retailer has an excellent personal relationship with the family of the customer and he stays in vicinity. At times, he also gives monthly credit to his customers and maintains a log book of the purchases of the customer over time. Normally, the retailer is changed, if there is a new person who is offering a lower price, better quality or better service. The Indian customer normally does not go to a distant place for groceries because of lack of mobility or the cost involved in mobility. However, he is prepared to go to places for buying apparels or electronic items which are high involvement products (Mckinsey, CII, 2008).

Table-3.1

<table>
<thead>
<tr>
<th>Structure of the Indian Consumer Market</th>
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<tbody>
<tr>
<td><strong>Consumer Classes</strong></td>
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<tr>
<td>The Rich (Rs. 210,000 or more)</td>
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<tr>
<td>The Consuming Class (Rs. 45,000 - Rs. 210,000)</td>
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<tr>
<td>The Climbers (Rs. 22,500 to Rs. 45,000)</td>
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<tr>
<td>The Aspirants (Rs. 16,000 - Rs. 45,000)</td>
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<tr>
<td>The Destitute (Below Rs. 16,000)</td>
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<td><strong>Total</strong></td>
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Note: Each household averages 5.5 individuals. Income figures actual not PPF adjusted

**Source: NCAER**

**Factors Affecting Consumer Decision-Making**

A consumer's purchase decision tends to be affected by the following four factors:

1. Demographic
2. Psychological
3. Environmental
4. Life Style

With the changing consumer lifestyle, increasing disposable income, changing market dynamics, the demand for quality, convenience and value is on rise.
3.3 **DEVELOPMENT OF SUPPLY CHAINS**

This seems to be a fowl game but to be successful in food retailing in India essentially means to draw away shoppers from roadside hawkers and local kirana stores to organized supermarket. This transition can be achieved through lucrative product, quality, pricing and service. So the success of food retailer depends on how best it understands and squeezes the supply chain. Another major factor is convenience shopping, because of which, the organized retail has an edge over local kirana or unorganized retail. On an average, an organized retail stocks up to 5000 SKU’s\(^{12}\) against few hundreds stocked at average unorganized retailers.

Sales growth in organized retail, after approaching 40% in 2008, slowed to low double digit in 2009, leading Indian retailers like Reliance and Future Group to delay their expansion plan. However, macroeconomic factors that favour growth of modern grocery retailing look promising. India’s educated, aspiration middle class, which is growing ever larger, is demanding a better retail environment and more global brands and styles. Global retailers can draw these shoppers away from traditional unorganized retail or wet market to organized global retail. Additionally, real estate values have experienced a major correction. As malls struggle to find occupants, retailers are receiving rent reduction or revenue sharing offers. Rentals in tier-1 cities are down 15 to 20 percent, and 25-40 percent in tier 2 and 3 cities. Global retailers, Walmart, Carrefour and Tesco have announced plans to in cash-and-carry wholesale trading and setting up of wholesale stores.

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\(^{12}\) Dr. Joy Mukhopadhyaya, “SCM: A comparative study of large organized food and grocery retailers in India”, IASMS, Bangalore.
The network character of the supply chain is important and the key issues in the management of the network are responsiveness, reliability and relationships (McLaren, Head, Yuan, 2002). The global nature of supply chain (inter-organizational supply chain) raises the problem of global versus local control. “Global co-ordination, local management” should be an approach for devising activities for global and local categories (McLaren, Head, Yuan, 2002). The global activities include, for example, building the players of the supply chain, network route structuring, information systems development, sourcing decisions and contracts. The local activities include local customer service, inventory control, manufacturing, management, etc.

Numerous models for managing the inventory of a perishable product have been developed (Nahmias, 1982). The particular relevance to the current study are models that deal with degradation of product quality and value

over time. In most early studies on perishable inventory, perishability is defined as the number of units of product that outdate (perish). Hence, the decay is not in terms of value, but in the number of units, and the decay is modeled with a probability distribution. For example, Ghare and Schrader (1963)\textsuperscript{14} develop an EOQ model for products in which the number of usable units is subject to exponential decay.

Covert and Philip (1973) and Philip (1974) extend this model, but use the Weibull distribution to model item deterioration. Shah (1977) extends the model to allow for shortages and backlogging, and Tadikamalla (1978) examines the case of Gamma distributed deterioration. Giri and Chaudhuri (1978) and Chakrabarty et al. (1978) extend these models to include situations in which demand rate is dependent upon either the inventory level or time.\textsuperscript{15}

Some papers do consider deterioration in product value over time. Weiss (1982) examines a situation where the value of an item decreases non-linearly the longer it is held in stock. Fujiwara and Perera (1993) developed EOQ models for inventory management under the assumption that product value diminishes over time according to an exponential distribution. However, they assume that the rate of deterioration of product value increases with the age of the inventory. Goh (1994) allows holding cost to vary based upon on-hand inventory levels. More recently, Ferguson et al. (2006) apply Weiss’ model to optimal order quantities for perishable goods in small to medium size grocery stores with delivery surcharges. Research on the perishability of fresh produce indicates that, unlike these models, the loss in product value and quality is at its highest rate immediately post-


production (at harvest), and the rate of loss in value declines until the produce finally “spoils” (Hardenburg et al. 1986, Appleman and Arthur 1919). To date, the perishability models that have been developed only consider inventory management, determining appropriate levels of perishable stock to meet demand. Ferguson and Ketzenberg (2006) examine the value of information sharing between retailers and suppliers for perishable products. Their research focuses on retailers’ replenishment policies when information is shared. Ferguson and Koenigsberg (2007) studied the effects of firms selling leftover perishable products at a lower price in competition with fresh product. But no studies consider broader supply chain design issues, which are the focus in current scenario and elaborated in this study. The researcher studied and discussed the model of perishability for fresh produce to examine how these products should be managed throughout the supply chain.

A number of frameworks have been proposed for supply chain design. One of the first was introduced by Fisher (1997), who devises a taxonomy for supply chains based on the nature of the demand for the product. For functional products (stable, predictable demand, long life cycle, slow “clockspeed”), Fisher argues that the supply chain should be designed for cost efficiency; for innovative products (volatile demand, short life cycle, fast “clockspeed”) he maintained that the supply chain should be designed to be fast and responsive. Lee (2002) expands upon Fisher’s taxonomy by suggesting that the supply process could be either stable or evolving. A stable supply process has a well established supply base and mature manufacturing/production processes. In an evolving supply process, technologies are still early in their development with limited suppliers. Kopczak and Johnson (2003) extend the framework to include coordination of activities across companies, improving information flows, and collaborative redesign of the supply chain as well as its products and processes.
Lee and Fetzinger (1997) introduce the concept of delayed product differentiation, or *postponement*. They showed that delaying final product definition until further downstream in the chain reduces variety in the early stages (in effect, making the product more functional). This creates opportunities for supply chain designs that can be *efficient* in the early stages and *responsive* in the final stages. In their studies of reverse supply chains, Blackburn et al. (2004) find that, for returned products that lose value rapidly over time, the supply chain should be *responsive* in the early stages and *efficient* in later stages. These studies suggest that supply chain strategies based on a simple choice between efficiency and response can be inappropriate when the product undergoes substantial differentiation or change in value as it moves through the chain. It is seen that in the case for perishable produce, the value of the product changes significantly, and appropriate supply chain structure is one that is responsive in the early stages and efficient in the later stages.

The comparative state of post harvest supply chain in Western countries and India is having a significant difference in terms of perishable produce. In the large produce operations, it is observed that fresh produce (in California, melons and sweet corn) are picked by hand and field packed, an extremely labour-intensive process. Produce (here melons) are picked by multiple teams of workers (10-20 workers) who move through the field behind a trailer pulled by a tractor. As melons are picked, they are tossed to workers on the trailer who sort and pack them into cartons according to size (of up to 30 melons). Picking rates by a team average about 50-60 cartons per hour. Cartons are stacked onto pallets, 42 cartons per pallet, and trailers can hold about 12-14 pallets, or up to about 590 cartons of melons. Periodically, these pallets are transferred to a nearby truck. In the peak season, a truck is filled with melons in about three to four hours, with multiple teams harvesting a given field. When full, the truck is driven to the cooling shed, where the melons are hydro, forced-air or vacuum cooled to preserve product quality. The process for sweet corn is similar. Cooling sheds are located throughout a growing region and serve as both a cooling facility and as a consolidation
point for outbound truck shipments. Cooling sheds serve several growers in a region and are typically owned and operated separately from the growing operations. The time and cost to transfer a batch of cartons from the field to the cooling shed depends on the location of the field. Transfer time to the cooling sheds is assumed to be independent of the transfer batch size, except in the unlikely event that the transfer batch size exceeds the capacity of the trailer. The time to transfer melons from the field to a cooling shed can vary from 15 minutes to an hour. freshly-picked produce begins a chemical process of respiration. Respiration not only generates carbon dioxide (CO2) and heat, but it also converts sugar to starch, causing the product to lose sweetness and quality. It is proved in laboratory measurements that the rate of respiration (and loss in sugar content) increases significantly with temperature (Hardenburg et al. 1986). Appleman and Arthur (1919) proved the effect of respiration on quality (and value) and that the loss of sweetness in corn over time follows an exponential decay function whose decay rate increases dramatically with increases in temperature. Because freshly-picked produce can have an internal temperature reaching 30-35 degrees Centigrade, quickly removing field heat is critical to maintaining product quality. Therefore, it is very important to move the product rapidly from the field to a cooling shed to preserve product quality (Jobling 2002 and Sargent et al. 2000). Hartz, Mayberry and Valencia (1996) observe that rapid removal of field heat maximizes post harvest life. Once the produce reaches the cooling shed and has been cooled to a temperature a few degrees above freezing, product deterioration occurs at a much lower rate. The product value (its taste and appearance) can be maintained for several weeks, provided that the “cold chain” is maintained throughout the remaining stages of the chain (Perosio et al. 2001).16

The retail supply chains usually are the Network type - the complex ones, because most products are not seized from single site. It also has a pool of

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players to be chosen in any category. Hence the flow of information through this dense network should be agile as well as systematic, to avoid demand distortion.

**Figure-3.3**

**Supply Chain Peculiarities**

*Indian farmer trapped in a vicious cycle of low risk taking ability, low investment, low productivity, weak market orientation, low value addition, low margin. Indian agribusiness globally uncompetitive, despite rich & abundant natural resources.*

*Large number of retailers, but most are small and fragmented. Low volume, and low bargain power.*

*Numerous intermediaries, lead to cost addition without value addition while blocking the information flow.*

*… Leading to Significant Quality Drop and Value Loss*

*Quantity drop through Food Supply Chain*

- More Intermediaries add to the inefficiency in the Chain:
  - Leading to wastage in the Chain
  - Drop in the quality of the product

*Price Increase through the Chain*
Firms are increasingly dis-intermediating the traditional supply chain of procurement for operational efficiency gains. They are attempting to reconstruct their own supply chain by forging direct ties with the original source of supply or using a service provider between them and suppliers. At present, the supply chain is a combination of: (i) direct procurement from farmers, small-scale suppliers, and large FMCG suppliers; (ii) APMC markets; and (iii) consolidators or distributors as a single intermediary point. The distributor channel is used only if the volume scale is low. Gradually, the organized retail value chain would prefer to lean towards the direct procurement approach in order to reduce the cost of the middleman. The direct procurement model benefits modern retailers for the following reasons: (i) maximizing its gains on large volume transactions; (ii) implementing store brand promotional schemes; and (iii) minimizing the operational cost. As for fresh fruits and vegetables, to a large extent, firms procure from APMC markets. At the same time, for bulk purchases firms contact farmers and fruit growers directly.

Perishable goods are susceptible to fluctuation in environmental parameters such as relative humidity, temperature or shock. The sensor technology has the potential to considerably improve the efficiency of supply chain.\textsuperscript{17}

Srabanti Chakravarti outlines the growing relevance and potential of supply chain in the arena of agribusiness which has been accepted around the world. Her paper titled “A study of agribusiness supply chains and intervention of E-commerce in Indian agribusiness” provides glimpses on various existing international and Indian agribusiness distribution practices with their merits and demerits and need for intervention of e-commerce to strengthen vertical integration across supply chain by providing real time

\textsuperscript{17} Alexander Ilic et.al., Auto-ID Labs White Paper WP-BIZAPP-046, March 2009.
information on pre and post harvest technology and marketing information to various stakeholders like farmers, retailers and consumers as well.¹⁸

**Demand Chain Management**

The demand chain management concept emphasizes that the primary control of the material flow should be the customer demand (Kotzb, 1999). Demand chain management thinking leads to a customer-centric design of the supply chain.

Order Penetration Point (OPP) is the point in the supply chain where products are allocated to a specific customer order (Andries, 1995). OPP in the supply chain is often discussed in conjunction with the term postponement. Postponement can be applied to form, time and place. Form postponement means that companies delay production, assembly or even planning and design until after the customer has placed an order. This increases the ability to fine tune products to specific customer wishes. Time and place postponement or logistics postponement means that the forward movement of goods is delayed to the last possible place or moment in the chain of operations and goods are kept in storage in the distribution chain (Prasad, 1995).

The positioning of the OPP has a crucial impact on the supply chain responsiveness and needed inventory levels. If the OPP is positioned near the end customer, the delivery time is shorter, but uncertainty and the risks for the manufacturer are higher. If the OPP is positioned far up-stream, the inventory risks are lower, but the service level to the customer is also lower. The lowest risk to the supplier is to have the OPP in manufacturing or production which eliminates the need for inventories. On the other hand, this might mean long delivery times and low service levels to the customers and

the final decision is a trade-off between cost and service level as opposed to competition.

**Economies of Scale And Sale**

There are three types of economies to be achieved with the supply chain approach on the system’s level: economies of scale, economies of scope and economies of speed (Shaw, Nisbet, Dawson, 2001). Economies of scale in the supply chain convert into money in two ways - greater bargaining power and lower unit costs, both being based on sheer volume. An economy of scope means the benefit of being able to share resources across products, markets and businesses. Economies of speed means the ability to react quickly to changing customer requirements, and improved performance that is based on better sharing of control information. To be able to realize the benefits, the network has to communicate openly and have common goals.

Economies of the sales make Every Day Low Price (EDLP) philosophy possible. EDLP is probably one of the most difficult pricing strategies for any retail business to execute. It requires a level of discipline that most retailers do not have. Trust has to be built with the consumers over a period of years convincing them that the business will promote and that the consumer will still be better off, receiving the lowest price for a basket of goods (Moyer, 1991).

EDLP offers many operational advantages as well. EDLP allows for more accurate forecasting and combined with POS data sharing with suppliers, helps reduce inventory throughout its supply chain improving inventory efficiency for both retailers and their suppliers (Tarascio, 1997). A second cost advantage of EDLP is that it does not require the kind of continuous price-item advertising that a high-low pricing retailer generally does.
Demand Distortion in Supply Chains And Bullwhip Effect

Forrester made simulation experiments with supply chains and described how a small change in market demand can lead to a substantial change in demand for the manufacturer/producer (Shah Janat, 2009). In his model a 10 percent variation in demand caused a variation of over 50 percent for the manufacturer. Forrester suggested that the prime reasons for the demand amplification were long supply chains with time delays in information processing, long lead times and different control policies for orders and inventories (Brito, 2001).

Cross-Docking and VMI

On the physical distribution side, one of the most important innovations has been cross-docking (Shah Janat, 2009). In cross-docking, the products delivered to a warehouse are sorted, reloaded and transported to the stores without ever staying in the inventory. In addition to an efficient distribution strategy, Wal-Mart implemented a new approach to inventory control together with Procter & Gamble. It gave the control of inventories to the supplier. This new approach is called Vendor Managed Inventory (VMI). In a working VMI-arrangement the supplier is able to see the real demand with the help of Point of Sale (POS) data, which is often called Electronic Point of Sale (EPoS) if transmitted electronically. Based on the actual sales information and inventory levels in the stores, the vendor makes the replenishment decisions concerning the quantities, shipping and timing. This eliminates the ordering and purchase decision process, thus reducing the distortion of demand information in the supply chain. The benefits of VMI are a better utilization of resources in production, transportation and a reduction of inventory levels. The supplier’s buffer stocks can be smaller due to the smoother demand signal. Additionally, the supplier has more freedom to coordinate the replenishment process proactively, instead of responding reactively to purchase orders.
Supply Chain, Retail and IT: A Correlation

Vinita Sahay states in her report (Retail in India: Use of IT), greatest fear is the scale of operations and the new age technologies used by the global giants. The global retail giants like Wal-Mart, Tesco, k-Mart operate on a scale that reduces their cost of procurement of goods and they are able to transfer these low cost advantages to the end consumers by providing them goods at a cheaper price. But it is not how cheap they are selling their goods for but how they are achieving this kind of low cost leadership, that needs to be understood. By looking into their operations in a holistic manner, one can see that all the cost savings these global giants could achieve, may be in procurement, supply chain, distribution, retention of customers, reducing least expenses per customers per sale, is been achieved though optimum use of technology and and information system.

Technology in Retail SCM

Importance of technology cannot be ruled out in the current scenario of retailing for various functions as a tool of achieving competitive advantages in the area, such as:

Consumer Interaction System:  
   i)  Bar coding and scanner  
   ii)  Payment  
   iii) Internet

Operation Support system:  
   i)  ERP System  
   ii) CRM system  
   iii) Advance planning and scheduling system i.e. provisioning & replenishment

Strategic Decision Support system:  
   i)  Store site Location  
   ii) Visual Merchandising  
   iii) E-commerce
Subrata Mitra expresses his views in the article “Supply chain issues in the Indian poultry-meat industry: the case of a vertically-integrated farm” (Refer: WPS No. 575/ December 2005), that the supply chains are still characterized by inefficiencies, diseconomies of scale, lack of investments and inadequate infrastructure. Public and private investments in research on genetics, nutrition, automation, disease control & food safety and creating adequate infrastructure in terms of warehouses and cold storage facilities should be encouraged. Policies and procedures also need to be eased to facilitate investments and exports. The focus should be on consolidation through mergers and acquisitions, and creating vertically-integrated firms. Success will depend on the ability of vertical integration and development of cold chains. If the items sold through outlets are not bar-coded, then there won’t be a proper accounting method for capturing the point-of-sale (POS) data and transmitting the same on a real-time basis to their local office and dressing/processing unit for better planning and forecasting.

Radio Frequency Identification (RFID) not only captures the POS data, but also stores the purchasing behaviour and enables tracking even in transit. Bar coding or RFID is essential in the unfortunate event of a product recall (Smola and Bear, 1999).

Advance technology will be utilized by many large retailers such as Wal-Mart if they open outlets in India in various formats to woo the middle and upper class that constitute about 60% of the population. These retailers will source, at least initially, their requirements of chilled and frozen items.

Price sensitivity of the Indian consumer towards perishable food and consumer preference towards seasonal produce is a significant factor for selection of retail stores for purchase decision.

Jayanta Roy & Pritam Banerjee say that our country possesses the world’s second largest cultivable land area with only the US having more arable land. (Refer: “Understanding India’s Economic Security Indicators, Policies and Perspectives”, Jayanta Roy, Principal Adviser, Trade and Globalization
Research, Confederation of Indian Industry (CII) & Pritam Banerjee, George Mason University, School of Public Policy; November 29, 2007). In spite of this fact, our system is suffering due to mismanagement of pre & post harvest management.

**Logistical Integration**

Transport of goods to and from India as well as local transport within India is also very high relative to most emerging market economies. Part of the explanation lies in the poor infrastructure. But there are significant problems with the regulatory architecture that governs the transport sector in India. Road transport, which is crucial to India’s economy, with over 80% of its passenger and 60% of its freight being carried by road, is subject to significant entry barriers. In the case of road transport, it is the state governments that determine the issuing of operator licenses, the routes, and the times that operators are permitted to run. The state government also determines the fares that operators can charge on a particular route. These licensing arrangements are susceptible to rent seeking. While there is ease of entry and exit in the road freight transport, with the Motor Vehicles Act that regulates this sector requiring only vehicle registration and a permit for operation, the inefficiencies in this sector are predominantly the result of cartels and price fixing by industry participants. Such inefficiencies have been a constraint on the development of an integrated national freight system in India.(Refer: Mehta (2006), “A Functional Competition Policy for India, Academic Foundation.
Retail Supply Chain and Consumer Pricing: A Correlation

Table-3.3

Consumer Price is 3.5 times of Farm Gate Price

<table>
<thead>
<tr>
<th>Intermediary</th>
<th>Addnl. Cost</th>
<th>Wastage</th>
<th>Mark-up</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmer</td>
<td>5%</td>
<td>10%</td>
<td>25%</td>
<td>100</td>
</tr>
<tr>
<td>Trader</td>
<td>2.5%</td>
<td>-</td>
<td>5%</td>
<td>125</td>
</tr>
<tr>
<td>Com. Agent</td>
<td>5%</td>
<td>10%</td>
<td>50%</td>
<td>131</td>
</tr>
<tr>
<td>Wholesaler</td>
<td>10%</td>
<td>-</td>
<td>75%</td>
<td>197</td>
</tr>
<tr>
<td>Retailer</td>
<td>10%</td>
<td>25%</td>
<td>75%</td>
<td>344</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intermediary</th>
<th>Addnl. Cost</th>
<th>Wastage</th>
<th>Mark-Up</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmer</td>
<td>10%</td>
<td>2%</td>
<td>13.2%</td>
<td>113</td>
</tr>
<tr>
<td>Growers Co-op</td>
<td>40%</td>
<td>2%</td>
<td>50%</td>
<td>170</td>
</tr>
<tr>
<td>Distribution Co.</td>
<td>25%</td>
<td>2%</td>
<td>50%</td>
<td>255</td>
</tr>
</tbody>
</table>

The problems, regulatory and infrastructural, extend to the entire gamut of logistical services that are crucial inputs to the economic system. The high transaction costs imposed by this inefficiency is worst felt by India’s poor and challenge India’s economic security and its efforts to move millions out of poverty. For example, About 30% of the fruits and vegetables grown in India (40 million tons amounting to US$ 13 billion) get wasted annually due to gaps in the cold chain such as poor infrastructure, insufficient cold storage capacity, unavailability of cold storages in close proximity to farms, poor transportation infrastructure, etc. This results in instability in prices, farmers not getting remunerative prices and rural impoverishment. Operating costs for Indian cold storage units are over $60 per cubic meter per year compared to less than $30 in most OECD countries (Refer Maheshwar and Chanakwa (2005), “Post-harvest Losses due to Gaps in Cold Chain in India: A Solution”, International Society for Horticultural Science (ISHA)).
The international aspect of the logistics infrastructure, i.e. the infrastructure, both physical and institutional, required for moving goods in and out of the country is referred to in trade literature as trade facilitation. Commenting on the trade facilitation scenario in India, Roy and Banerjee (Refer Roy and Banerjee (2007), “Trade Facilitation: The Next Big Step in India's Trade Reform in India’s Liberalization Experience: Impact of WTO”, Indian Council for Research in International Economic Relations (ICRIER) Publication) point out that India continues to be a laggard in implementing reforms in this area despite some notable improvements.

Figure-

‘Perishable (F&V)’ Supply Chain

Supply chains are now more dynamic and uncertain with an interdependency of two-way relationships that increases risk and vulnerabilities for retailers. In fact, obtaining a holistic view of supply chain has become a source of competitive advantage for high-performance businesses like retail. Changes on nearly every front have combined to make modern supply...
chains much more complex and interconnected. These changes include sourcing and production, information and communications technology, consumer expectations, pricing volatility and product availability, financial conditions and regulatory requirements.