CHAPTER - III

TECHNOLOGY INFLUENCE IN INDIAN RETAIL SECTOR

3.1 RETAIL INDUSTRY

Retail comes from the Old French word tailer (compare modern French retailer), which means “to cut off, clip, pare, divide” in terms of tailoring (1365). It was first recorded as a noun with the meaning of a “sale in small quantities” in 1433 (from the Middle French retail, “piece cut off, shred, scrap, paring”). Like in French, the word retail in both Dutch and German (detailhandel and Einzelhandel, respectively) also refers to the sale of small quantities of items. Retailing is the set of business activities that adds value to the products and services sold to consumers for their personal or family use. Retailers are a key component in a supply chain that links manufacturers to consumers. A supply chain is a set of firms that make and deliver goods and services to consumers. Why are retailers needed? The answer, generally, is no because retailers are more efficient at performing the activities that increase the value of products and services for consumers. These value-creating activities include (1) providing an assortment of products and services, (2) breaking bulk, (3) holding inventory, and (4) providing services (Levy and Weitz, 2012). The utilities provided by retailers create value for consumers. Time, place, form, and possession utilities are offered by most retailers in varying degrees, but one utility is often emphasized more than others. Some utilities are time utility, place utility, form utility, and possession utility.

Retailing is a global industry. Many retailers are pursuing growth by expanding their operations to other countries. Walmart remains the undisputed leader in the retail industry, with sales that are more than three
times greater than those of Carrefour, the second largest retailer. The largest 250 retailers operated in 6.8 countries on average, with 21.3 percent of their sales coming from outside the retailers’ home countries. Retailers headquartered in Europe are more international than U.S.-based retailers (Levy and Weitz, 2012).

The global economic recession, inflation, and high unemployment rates are some of the challenges that are negatively affecting the retail industry. Conversely, some factors that are likely to boost sales in the industry include urbanization, technological growth, increase in product demand and selection, and the continued popularity of online purchasing. A combination of factors such as demographics and consumer spending habits impacts market dynamics significantly. Rising GDP growth, burgeoning population, greater disposable income, and increasing consumer spending are combining to drive the Global Retail industry and opportunities for retail segment players. The market is forecast to reach an estimated $20,002 billion in 2017 with a CAGR of 3.9% over the next six years (2012-2017). The retail industry is highly fragmented and is dependent on macroeconomic factors such as GDP, disposable income, and consumer spending. Asia Pacific (APAC) dominates the industry, representing 35% of the global market. The APAC retail industry is expected to drive the market and grow at the highest rate among all regions during the forecast period of 2012-2017 (Lucintel, 2012).
### Table 3.1: Top 10 Retailers around the World

<table>
<thead>
<tr>
<th>Rank</th>
<th>Name of the Company</th>
<th>Country of Origin:</th>
<th>Countries of Operation</th>
<th>Annual Revenue in $ Bn (2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wal-Mart</td>
<td>U.S.</td>
<td>27</td>
<td>421.85</td>
</tr>
<tr>
<td>2</td>
<td>Carrefour</td>
<td>France</td>
<td>36</td>
<td>122</td>
</tr>
<tr>
<td>3</td>
<td>Tesco</td>
<td>U.K.</td>
<td>14</td>
<td>94.19</td>
</tr>
<tr>
<td>4</td>
<td>Metro AG</td>
<td>Germany</td>
<td>33</td>
<td>89.09</td>
</tr>
<tr>
<td>5</td>
<td>LIdl</td>
<td>Germany</td>
<td>25</td>
<td>82.4</td>
</tr>
<tr>
<td>6</td>
<td>The Kroger</td>
<td>U.S.</td>
<td>1</td>
<td>82.19</td>
</tr>
<tr>
<td>7</td>
<td>Costco Wholesale</td>
<td>U.S.</td>
<td>9</td>
<td>77.95</td>
</tr>
<tr>
<td>8</td>
<td>Aldi Einkauf GmbH</td>
<td>Germany</td>
<td>18</td>
<td>67.70 (2009)</td>
</tr>
<tr>
<td>9</td>
<td>The Home Depot</td>
<td>U.S.</td>
<td>5</td>
<td>67.997</td>
</tr>
<tr>
<td>10</td>
<td>Target</td>
<td>U.S.</td>
<td>1</td>
<td>67.39</td>
</tr>
</tbody>
</table>


India retail industry is the largest industry in India, with an employment of around 8% and contributing to over 10% of the country’s GDP. Retail industry in India is expected to rise 25% yearly being driven by strong income growth, changing lifestyles, and favourable demographic patterns. Shopping in India has witnessed a revolution with the change in the consumer buying behaviour and the whole format of shopping also altering. Industry of retail in India that has become modern can be seen from the fact that there are multi-stored malls, huge shopping centers, and sprawling complexes which offer food, shopping, and entertainment all under the same roof.

The estimated value of the Indian retail sector is about USD 500 billion presently. India’s retail sector will become a USD 1.3 trillion opportunity by 2020. By that time, there will be close to 200 cities with
population of over 0.5 million that will fuel retail growth. Further, modern retail, which currently stands at 5 percent, will grow about six times from the current USD 27 billion to USD 220 Billion in the next 8 years (Shilpa Gupta, 2012).

In the Indian retailing industry, food is the most dominating sector and is growing at a rate of 9% annually. The branded food industry is trying to enter the India retail industry and convert Indian consumers to branded food. Since at present 60% of the Indian grocery basket consists of non-branded items. India retail industry is progressing well and for this to continue retailers as well as the Indian government will have to make a combined effort.

**Table 3.2: Major Indian Retailers**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Store group</th>
<th>Brands</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pantaloon Retail:</td>
<td>Big bazaar, Food bazaar, Hometown, furniture bazaar, collection-i, e-zone, shoe factory, Depot, Star, Sitara Futurbazaar.com, Bowling co.</td>
</tr>
<tr>
<td>2</td>
<td>K Raheja Group</td>
<td>Shopper’s Stop, Crossword, Hyper City, In orbit Mall</td>
</tr>
<tr>
<td>3</td>
<td>Tata group</td>
<td>Westside, Star India Bazaar, Landmark, Titan, Croma, Tanishq</td>
</tr>
<tr>
<td>4</td>
<td>RPG group</td>
<td>Spencer’s Hyper, Spencer's Daily, Books and Beyond, Music World, Au Bon Pain, Beverly Hills Polo Club</td>
</tr>
<tr>
<td>5</td>
<td>Landmark group</td>
<td>Home Centre, Centrepoint, Babyshop, Splash, Shoe Mart, Lifestyle, Max, Lifestyle Department Stores, SPAR hypermarkets, Foodmark, Fun City, Fitness First, Citymax India</td>
</tr>
</tbody>
</table>
Table 3.2: Contd…

<table>
<thead>
<tr>
<th></th>
<th>Retail Group</th>
<th>Retail Outlets</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Piramal Group</td>
<td>Jammin, Pyramid Megastore, TruMart</td>
</tr>
<tr>
<td>7</td>
<td>Mahindra</td>
<td>Mom &amp; Me</td>
</tr>
<tr>
<td>8</td>
<td>Bharti-Walmart</td>
<td>Best Price Modern Wholesale</td>
</tr>
<tr>
<td>9</td>
<td>Reliance</td>
<td>Reliance MART, Reliance SUPER, Reliance FRESH, Reliance Footprint, Reliance Living, Reliance Digital, Reliance Jewellery, Reliance Trends, Reliance Autozone, iStore</td>
</tr>
</tbody>
</table>

3.1.1 Retail ownership

Form of ownership distinguishes retail outlets based on whether individuals, corporate chains, or contractual systems own the outlet. Second, level of service used to describe the degree of service provided to the customer. Last is type of merchandise line describes how many different types of products a store carries and in what assortment. An independent owns only one retail unit. Since only one store location is involved, a detailed list of specifications can be derived for the best location and a thorough search can be undertaken. The one store location also lowers investment costs for leases, fixtures, employees, and merchandise. An independent often has the image of a friendly, personalized retailer.

Chains are multiple retail units under common ownership, which utilize centralized purchasing and decision making. Competitive advantages for chain stores include bargaining power, wholesale function efficiencies, multiple-store efficiencies, computerization, access to media, well-defined
management, and long-run planning. Chains have a number of disadvantages: inflexibility, high investments, reduced control, and limited independence.

Franchising is defined as a contractual arrangement between a franchisor and a retail franchisee, which allows the franchisee to conduct a given form of business under an established name and according to a given pattern of business. A franchisor benefits because control is acquired and growth is increased. A franchisee benefits because a well-known name and shared costs are achieved at a reasonable price. A leased department is a department in a retail store that is rented to an outside party. The proprietor of a leased department is usually responsible for all aspects of its operations (including fixtures) and normally pays the store a percent of sales as rent. The store imposes various requirements on the leased department to ensure overall consistency and coordination.

Vertical marketing systems occur when successive stages of production and distribution are owned by a manufacturer, wholesaler, or retailer or two of these categories. A vertically integrated firm can achieve many objectives such as self-sufficiency, lower costs through elimination of middlemen, direct contact with the consumer, greater bargaining power when dealing with outside suppliers or retailers, a sense of achievement, and time efficiencies in orders and deliveries. A consumer cooperative is a retail firm that is owned by its customers. A group of consumers invests, receive stock certificates, elect officers, manage the operations, and share the profits or savings that accrue.

3.1.2 Retail Product Categories

Broadly, retail product category is classified as follows:

1. Food products
2. Hard goods or durable goods ("hard-line retailers") - appliances, electronics, furniture, sporting goods, etc. Goods that do not quickly wear out and provide utility over time.

3. Soft goods or consumables - clothing, apparel, and other fabrics. Goods that are consumed after one use or have a limited period (typically under three years) in which you may use them.

Major Market Retail Report (MMRR 2012) identified 33 specific product categories. The retailers covered in any one product category include both mass merchants as well as specialty stores.

The following is a list of product categories in MMRR:

1. **Personal Care Products**: hand soap, shampoo and conditioner, facial tissue, toothpaste, baby products, lotions, deodorant, etc.

2. **Cosmetics & Fragrances**: moisturizer, cleansing creme, mascara, eyeliner and other make-up, lipstick, toiletries, perfumes and colognes, etc.

3. **Non-Prescription Health Products**: aspirin and other pain killers, cough and cold remedies, stomach remedies, bandages, contact lens solution, etc., bought without a doctor’s prescription

4. **Prescription Drugs**: medicine prescribed by a doctor and supplied by a qualified pharmacist

5. **Photography & accessories**: digital cameras, camcorders, memory cards, camera cases, photo albums, etc.

6. **Jewellery, Watches & Related**: bracelets, earrings, pendants, wristwatches, ring, etc. either for yourself or as a gift.
7. **Greeting Cards & Gift Wrap**: Birthday cards, Christmas cards, invitations, wrapping paper, bows, ribbons, etc.

8. **Books & Magazines**: hardcover and paperback books of all types, magazines and periodicals, etc.

9. **Music & Videos**: pre-recorded music CDs, pre-recorded movie DVDs or Blu-ray, etc.

10. **Video Games and Equipment**: games, consoles and accessories for Playstation, XBox, Nintendo, GameBoy, GameCube, PC, etc.

11. **Children’s Toys & Games**: kid’s bikes and trikes, dolls, model cars, construction sets, activity toys, children's books, board games, etc.

12. **Sporting Goods**: soccer balls, hockey sticks, baseball gloves, skis, fishing tackle, camping equipment, etc., but not clothing and footwear

13. **Athletic Footwear & Clothing**: running shoes, court shoes, jerseys, team jackets, caps, ski outfits, etc.

14. **Men’s Dress Wear**: suits, jackets, ties, dress shirts, dress slacks, coats, etc.

15. **Men's Casual Wear**: jeans, t-shirts, socks and underwear, shorts, outdoor clothing, sweat shirts, sweaters, etc.

16. **Lingerie, Hosiery & Related**: pantyhose, bras, intimate apparel, slips, nightgowns, pajamas, etc.

17. **Women’s Dress Wear**: office wear, suits, evening dresses, gowns, blazers, coats, etc.

18. **Women’s Casual Wear**: shorts, sweaters, jeans, t-shirts, outdoor jackets, etc.
19. **Children’s Wear**: baby clothes, kid's pants and tops, socks and underwear, sweaters, jackets, snow suits, etc.

20. **Footwear**: shoes, boots, sandals, etc., for men, women or children, but excluding sports footwear like running shoes

21. **Linens, Towels, Bedding, Etc.**: bath and hand towels, face cloths, placemats, napkins, tablecloths, bed sheets, pillowcases, comforters, duvet covers, etc.

22. **Home Decor & Accessories**: mirrors, clocks, artwork, lamps and lighting, curtains and blinds, cushions, vases, candles and holders, floor mats, baskets, etc.

23. **Furniture**: tables, chairs, sofas, beds, dressers, desks, etc.

24. **Housewares**: dishes, cutlery, kitchen gadgets, carving knives, serving trays, food storage containers, etc.

25. **Small Appliances**: electric kettles, blenders, mixers, toasters, shavers, blow dryers, etc.

26. **Major Appliances**: refrigerators, stoves, washers, dryers, dishwashers, etc.

27. **Entertainment Electronics**: televisions, DVD players, stereo components, CD players, car audio, MP3 player, iPod, etc.

28. **Communications Electronics**: telephones, cell phones, smartphones, Bluetooth, chargers, cases, etc.

29. **Computer Hardware & Software**: Desktop or laptop computers, iPad or other tablet, printers, monitors, cables, blank CDs and DVDs, software, etc.

30. **Home Office & School Supplies**: pens, paper, calculators, file folders, binders, etc.
31. **Paint & Decorating Supplies**: indoor and outdoor paint and stain, wallpaper, brushes, stencil kits, etc.

32. **Hardware & Home Improvement**: nails and screws, hand and power tools, outdoor equipment, mail boxes, plumbing and electrical supplies, door locks, etc.

33. **Lawn & Garden**: water hose, soil, fertilizer, gardening tools, seeds, bulbs, patio furniture, rakes, snow shovels, sidewalk salt, etc.

### 3.1.3 Retail Formats

The formats of a retailer is the overall appearance and feel that it presents to customers, primarily its look and layout, the sort of range it stocks and the approach taken to pricing. Format is distinct from fascia which, strictly speaking, refers solely to external appearance. Retailers occasionally use it as a synonym for format. The format, together with range, pricing and marketing, is one of the key determinants of a retailer’s success. Of these, the format is very often the hardest to get right. A good format will both draw in customers (generating footfall) and help present products well to generate sales. Because the format is so important, growth investors can often benefit by identifying smaller retailers who have recently developed formats that are good enough to provide a platform for sustained growth (http://moneyterms.co.uk/retail-format/).

**Mom-and-pop Stores**: These are small family-owned businesses, which sell a small collection of goods to the customers. They are individually run and cater to small sections of the society. These stores are known for their high standards of customer service. These stores are seen in local community often are family-run businesses. The square feet area of the store depends on the store holder.
**Convenience store:** They are relatively small stores located near residential areas. They are open for long hours, seven days a week and offer a limited line of convenience products like bread, eggs, milk etc. This store is ideal for emergency and immediate purchases as it often works with extended hours, stocking everyday;

**Department stores:** Department stores are general merchandisers. It is large-scale retail outlet, often multileveled, whose merchandise offer spans a number of different product categories. They offer a huge assortment of “soft” and "hard goods; often bear a resemblance to a collection of specialty stores. They offer to the customers mid- to high-quality products. Though they sell general goods, some department stores sell only a select line of products. They are defined as those establishments depending on good, clothing and home related items. They offer considerable customer service.

**Super markets:** One of the other popular retail formats in India is the supermarkets. Super markets are large, low cost, low margin, high volume, self service operations designed to meet the needs for food, groceries and other non food items like health and beauty care products. People head to supermarkets when they need to stock up on groceries and other items.

**Hyper markets:** Combination of super markets and departmental stores are called as “Hyper market”. They provide variety and huge volumes of exclusive merchandise at low margins. The operating cost is comparatively less than other retail formats. A retail store with a sales area of over 2500 square meter, with at least 35 per cent of selling space devoted to non-grocery products like clothes, jewellery, hardware etc. are called hypermarkets.
Speciality stores: A stores specializing in a particular type of merchandise or single product goods categories is termed as a speciality store. Speciality stores are owing to their unique designs and patterns. There is dramatic increase in the availability of apparel products due to consumers rising demand and higher disposable income. These are characterized by a narrow product line with deep assortments in that product line. Specialty stores usually concentrate on apparel, jewellery, fabrics, furniture etc. Branded stores also come under this format.

Category killers or Category Specialist: By supplying wide assortment in a single category for lower prices, a retailer can “kill” that category for other retailers. For few categories, such as electronics, the products are displayed at the centre of the store and sales person will be available to address customer queries and give suggestions when required. Other retail format stores are forced to reduce the prices if a category specialist retail store is present in the vicinity.

Off-price retailers: They buy products from manufactures in off seasons as a deep discount and sell them at less than retail prices. The merchandise may be in odd sizes, unpopular colors or with minor defects. They may be manufacturer owned and care called factory outlets.

Catalogue showroom: Catalogue retailers usually specialize in hard good such as house wear, jewellery, and consumer electronics. A customer walks into this retail show room, goes through the catalogue of the products that he would like to purchase.

Malls: One of the most popular and most visited retail formats in India is the mall. These are the largest retail format in India. Malls have a range of retail shops at a single outlet. Malls provide everything that a
person wants to buy, all under one roof. From clothes and accessories to food or cinemas, malls provide all of this, and more.

**Discount Stores:** They tend to offer a wide array of products and services, but they compete mainly on price offers extensive assortment of merchandise at affordable and cut-rate prices. Normally retailers sell less fashion-oriented brands. Discount stores are those that offer their products at a discount, that is, at a lesser rate than the maximum retail price. This is mainly done when there is additional stock left over towards the end of any season. Discount stores sell their goods at a reduced rate with an aim of drawing bargain shoppers.

**Street vendors:** Street vendors, or hawkers who sell goods on the streets, are quite popular in India. Through shouting out their wares, they draw the attention of customers. Street vendors are found in almost every city in India, and the business capital of Mumbai has a number of shopping areas comprised solely of street vendors. These hawkers sell not just clothes and accessories, but also local food.

**Kiosks:** Kiosks are box-like shops, which sell small and inexpensive items like cigarettes, toffees, newspapers and magazines, water packets and sometimes, tea and coffee. These are most commonly found on every street in a city, and cater primarily to local residents.

**Warehouse stores:** Warehouses that offer low-cost, often high-quantity goods piled on pallets or steel shelves; warehouse clubs charge a membership fee;

**E-tailers:** The customer can shop and order through internet and the merchandise are dropped at the customer's doorstep. Here the retailers use drop shipping technique. They accept the payment for the product but the customer receives the product directly from the manufacturer or a
wholesaler. This format is ideal for customers who do not want to travel to retail stores and are interested in home shopping. However it is important for the customer to be wary about defective products and non secure credit card transaction.

**Vending Machines:** This is an automated piece of equipment wherein customers can drop the money in the machine and acquire the products.

**Automated Retail:** stores are self-service, robotic kiosks located in airports, malls and grocery stores. The stores accept credit cards and are usually open 24/7. Examples include ZoomShops and Redbox.

**Big-box:** stores encompass larger department, discount, general merchandise, and warehouse stores.

### 3.1.4. Retail Atmospherics

“A majority of consumers remember occasions when store atmosphere caused them to buy more or spend more time at a store. Among those influenced almost half report that they spent more money in the store, not just more time”. From this information, it can be concluded that it is important for retailers not to overlook atmospherics because they can considerably increase sales volumes and numbers. In retailing atmosphere refers to the store’s physical characteristics that are used to develop an image and draw customers. A retailer’s sights, sounds, smells and other physical attributes contribute to the image projected to consumers. “Atmosphere” is the psychological feeling a customer gets when visiting a retailer

The “total retail experience” is comprised of all elements in a retail offering that encourage or inhibit customers during their contact with a
Retailer. It includes the number of salespeople, displays, prices, brands, inventory levels, and parking facilities. Customer dissatisfaction can occur if any of these items are unsatisfactory to the consumer (for example, lack of sales help, inadequate parking, little brand selection, or low inventory levels).

Retail atmospherics are the little steps that retail companies should take to make the purchasing experience easier, and more pleasant, on the customers. Retail atmospherics are steps that will usually increase sales and profits with little effort on the part of the retailer. In most cases, the cost of these steps are minimal next to the amount of extra money that is made with them, and the amount of money that would be lost without taking the steps. These are simple steps that make the customer more comfortable with their environment (Vincent Poupard, 2010). Berman and Evans (2001) divide atmospheric stimuli or elements into four categories: the exterior of the store, the general interior, the layout and design variables, and the point-of-purchase and decoration variables.

1. **Exterior**

A storefront is the total physical exterior of the store, including the marquee, entrances, windows, lighting, and construction materials. With its storefront, a retailer can present a conservative, trendy, upscale, discount, or other image. A marquee is a sign that displays the store’s name. It should attract attention. Display windows have two main purposes: to identify the store and its offerings, and to induce people to enter. Good exterior visibility means that pedestrian and/or vehicular traffic must clearly see storefronts or marquees. The goal for a retailer is to have its store or center appear unique. The nearby stores and the surrounding area contribute to atmosphere. They present image cues. Parking facilities can add to or detract from store atmosphere, based on access, cost, and nearness. The store’s image is
diminished by congestion, when its parking lots, sidewalks, and/or entrances are jammed. Customers may also spend less time shopping if they feel crowded.

2. **General Interior**

   Once customers are inside a store, various elements affect their perceptions. The elements of store interior includes flooring, Colors, Scents, Wall textures, Wide, uncrowded aisles, vertical transportation (Stairs, Elevators and Escalator), can all add to the atmospherics. Most retailers have come to the realization at this point that music calms people, and when people are calm, they are more likely to spend more money. Retail atmospherics teach that the music should make people comfortable, and not blow them away. If music could be used to symbolize the product being sold in the store, that kind of music should be used. Along with heat, air, and lighting, there are other aspects of a store's utilities that add to the customer's experience when talking about retail atmospherics. If you notice, larger stores have both bathrooms and drinking fountains. Any store in which you are expected to spend a lot of times should have these types of facilities for your use. In some cases, large stores might actually be forced to close if their bathrooms have to be shut down (Vincent Poupard, 2010).

   Store fixtures can be planned based on both their utility and aesthetics. Pipes, plumbing, beams, doors, storage rooms, and display racks and tables all affect atmosphere. The number, manner, and appearance of store personnel reflect the store’s atmosphere. Self-service creates a discount, impersonal image. Top-line merchandise yields a different image than lower-quality items. Prices contribute to image in two ways. One the level of prices fosters a perception of the store. Second, the way prices are displayed is a vital part of atmosphere. An upscale store places cash registers in inconspicuous areas, while a discount store locates cash registers
centrally, with signs pointing to them. The technologies used by the store and the modernization of its building and fixtures also have an impact on image.

Retail atmospherics deal a lot with signs. If a store has something on sale, it should be clearly marked so that the customer can be directed towards that, or those, items. Clearance should be clearly marked differently than the rest of the merchandise on the sales floor. While retail atmospherics suggest that all items that are for sale should be marked, many state laws take care of this issue on their own. While you might think that cleanliness should be a basic staple of retail atmospherics, how many times have you been in stores and seen dust? How many times have you seen dirty windows as you walk through the front doors? How many times have you been stuck to the floor by a spillage of pop that had not been cleaned up hours after it appeared? Cleanliness is an aspect that is often even forgotten by the strictest of retail stores (Vincent Poupard, 2010).

Employees are also directly impacted by retail atmospherics. Their section deals with performing customer service to the best of their ability. They should be easy to find and identify, and should be knowledgeable about the product that is in their department. Maybe, employees should wear name tags, should smile, and should engage the customer whenever possible. Out of all of the area of retail atmospherics, the employee section is the one that is drifting further and further away. Superstores like Wal-Mart and Target are spending less time and money on training their employees to ensure that this area of retail atmospherics is progressed. It will be interesting to see if this trend continues, or changes in the future (Vincent Poupard, 2010).
3. **Store Layout**

A store layout is the design in which a store's interior is set up. Store layouts are well thought out to provide the best exposure possible. They are designed to create an attractive image for consumers (Jennifer VanBaren, n.d.). The goal of any retail location is to draw customers into the store and then persuade them to make a purchase. Good advertising and promotion work to bring customers in, but what happens once customers get into a store largely depends on the layout and design of the store. Both play a huge role in how customers rate their experiences and whether they decide to buy, and if they return or recommend the store to others (Miranda Brookins).

If the store wants to create an experience for customers who enter the store, it need to picture the ideal setup and how customers will move from the front of the store to the back of the store to browse products and pay for purchases without encountering obstacles. The main goals of the layout should be to create a space where customers and sales associates can move freely, maximize space and maximize product exposure. There are three basic types of store layouts that attempt to accomplish these goals. They are the free flow layout, the grid pattern layout and the spine layout.

**Free Flow Layout**

Free Flow layout provides a spacious store layout that is flexible and ideal for displaying impulse items. Products are arranged throughout the store using racks and shelves placed so that customers can move around the store freely and employees can access customers immediately to assist with buying decisions. A free flow store layout is ideal for clothing stores, jewellery stores, boutiques and small specialty shops. This type of layout should be used cautiously because it can appear cluttered, instead of spacious and free moving, if product displays and racks aren't situated to maximize space.
Grid Pattern Layout

Grid pattern layout is a more rigid structure that offers less flexibility and encourages customers to search for items on their own. Grid layout is arranged in multiple rows filled with a variety of products throughout the store. Key products are displayed at the end of each row to highlight them. This type of layout offers customers an opportunity to familiarize themselves with where products are located after repeat trips to the store. Drugstores, supermarkets and superstores typically use this type of layout.

Spine Layout

The spine layout, which can incorporate elements of the free flow and grid pattern store layouts, is the third most commonly used layout strategy. This type of layout uses a single, long main aisle that goes from the entrance of the store straight to the back of the store. With this layout, merchandise can be displayed on one side or both sides using the free flow or grid layout or a combination of the two. Many department stores have a similar theme. People designing the layout of a store try to utilize the space they have in the most efficient manner. This includes the ability to display as many goods as possible, avoid shrinkage and stimulate customers to make purchases. This also includes allocating enough space for storage purposes.

The space for each product category is calculated, with both selling and nonselling space considered. Under the model stock approach, a retailer determines the floor space necessary to carry and display a proper merchandise assortment. This method is used by apparel and shoe stores. With the sales–productivity ratio, a retailer assigns floor space on the basis of sales or profits per foot. Highly profitable products receive the greatest space. Food stores and bookstores use this technique. Floor space is allocated among the following:
i. **Selling space**: This is the area used for displays of merchandise, interactions between salespeople and customers, demonstrations, and so on. Self-service retailers apportion most space to selling.

ii. **Merchandise space**: This is the area used to stock nondisplayed items. It is large for traditional shoe stores.

iii. **Personnel space**: This is the area set aside for employees to change clothes, to take lunch and coffee breaks, and for rest rooms. This area is strictly controlled because retail space is valuable.

iv. **Customer space**: This contributes to mood and can include a lounge, benches and/or chairs, dressing rooms, rest rooms, a restaurant, a nursery, parking, and wide aisles. Discounters are more apt to skimp on these areas.

v. More firms now use planograms to assign space. A planogram is a visual representation of the space for selling, merchandise, personnel, and customers as well as for product categories. It may be hand-drawn or computer-generated.

4. **Interior (Point-of-Purchase) Displays**

The retailer devises interior point-of-purchase displays, which provide shoppers with information, add to store atmosphere, and serve a substantial promotional role. Two types of merchandise are usually exhibited near the POS. First, an open assortment that encourages customers to feel, look at, and/or try on products. It is used for greeting cards, books, magazines, and apparel. Second, a closed assortment that does not permit touching and/or trying on items. It is often used for computer software, CDs, and DVDs. The point of sale area is sometimes depicts a product offering in a thematic manner and sets a specific mood (e.g., Presidents’ Day). With an
ensemble display near the POS, a complete product bundle is presented rather than showing merchandise in separate categories (e.g., shoes, socks, pants, shirt, and sports jacket). With a rack display, merchandise is hung and displayed on a rack. A cut case is an inexpensive display that leaves merchandise in its original carton. A dump bin has an open assortment of roughly handled items (e.g., piles of sale clothing). Both project a low-price image. Posters, signs, and cards can dress up all types of displays. They provide information and stimulate customers to shop. A mobile, a hanging display with parts that move, serves the same purpose but stands out more. Electronic displays are also widely used.

3.1.5 Retail as Supply Chain Activity

The Retail business has a unique structure because it is driven by product flow across the supply chain. The fast moving nature of sales, the accentuated importance of availability and the complexity of managing uncertain demand levels are further exacerbated by the perishable nature of many of the goods passing across the supply chain.

All supply chain inefficiencies are heightened as order delays or inaccuracies don’t just build delays into the supply chain as with other industries. This directly affects the retailer’s ability to conduct business and offer a level of service to customers. The items purchased provide information on merchandise sold in the store; this is the basis of sales analysis and decisions on replenishment re-ordering and merchandise planning. If this information is passed on to the manufacturer; it can help reduce production time. This is particularly true in case of fashion items, which have a very short life cycle. For example data gathered in this manner may indicate youngsters buying certain styles in Jeans or colors, in the tee shirts from the store. To service this section of the audience the retailer may need replenishments faster. The use of technology aids the collection and
transmission of information. The trends in sales can be analyzed. This helps avoid situations of stock out helps spot merchandise or products timely markdowns and higher inventory turns.

The use of technology aids data collection. Data can be collected about consumers, their purchases the frequency of their buying and the typical basket size. This information helps the retailer distinguish the customers who shops at his store frequently and also reward them. For example information gathered about a customer may reveal preferences for certain brands; this may be used for further communication with the customer regarding promotional offers etc. The data on purchase made is also passed on to the credit card organization for payment to the merchant establishment and also for billing the customer (Sree Rama Rao, 2010).

3.2 TECHNOLOGIES USED IN RETAIL INDUSTRY

The information needs of the retailer largely depend on the size and the spread of the organization. In most cases a small boutique operator or a small retailer like the baniya can do manual billing and gather a fair amount of information by making a phone call or making a personal visit to the store. With an increase in the number of stores and /or an increase in the number of products sold in the store, gathering of information becomes crucial. Technology plays a vital role in gathering this information and making it available to the right set of persons (Sree Rama Rao, 2010).

Much of the retail operations functionality is driven by customized point solutions in areas such as merchandizing, supply chain management, in-store operations, seasonality and promotions planning. Retail operations are inherently complex due to four factors:

a) Product complexity. The retail sector has a high degree of product complexity, with the number of SKUs in stores running anywhere from the
tens of thousands to more than two hundred thousand, a high degree of seasonal and fashionable items, and a lack of standardization of product hierarchies.

b) Supply chain challenges. With so many different outlets and channels, multiple hand-offs, and high frequency of replenishment, developing and managing an efficient supply chain remains one of the primary challenges in the retail sector.

c) Scale complexity. Retail operations are executed on an extremely complex scale. It deals with hundreds of millions of transactions per day, driven by millions of customers who shop through tens of thousands of outlets.

d) Process complexity. The business processes that support this environment are also inherently complex due to the multiple touch points across players in the value chain (manufacturer, distributor, retailer, consumer), the coordination required between the different planning cycles of each of these players, and geographic dispersion.

There are critical areas where IT can reduce complexity and improve results:

Merchandizing systems impact top-line revenues and need to be configured, customized and managed effectively for the retailer to improve its top line. To achieve this, retailers need to effectively mine large amounts of data and leverage this data to carry out effective forecasting, assortment planning, and collaboration with its suppliers so that promotions and other merchandizing activities are effective and efficient. Supply chain systems are key from a bottom line point of view as they play a key role in getting the right product to the right place at the right time which in turn impacts the inventory levels and the rate of flow of products through the retailer’s stores.
both of which are significant components of the retailer’s cost of doing business (SYNTEL, n.d.).

Information technology (IT) has influenced every aspect of our lives and cultures. Without IT-based applications, it would be difficult to keep information stored securely, process information efficiently and communicate conveniently. IT will not only continue playing a key role in the convergence of computing, communications and all other aspects of computational science and applications but will also influence the future’s roadmap in many significant areas. Whether at headquarters, in the warehouse or at the store, the use of information technology in logistics, merchandise management and marketing is the crucial factor today for successful retailing. However, the technology alone often does not produce the expected benefits. Closely connected with technological innovation is the need for optimising horizontal and vertical business processes.

Increasingly, technology is playing ever more influential role in retail success. Information Systems, starting with customer records, inventory control, loss prevention, supply chain, workforce management and business intelligence changing the efficiency and effectiveness of retail operations to a point where retailers who do not embrace the technology move to the forefront of businesses that are doomed to fail. Even those retailers who believe they understand the 6 Pillars of Success in Retail: People, Price, Product, Promotion, Place and Pixel, still cannot reach the levels of success they strive for because of their unbalanced focus on Product/Merchandising. Technology used in retail stores includes front-end and back-end solutions and technology that connects retail stores and chains to enterprise-wide business solutions. Retail technology ideally improves the customer experience with regard to service and efficiency (Neil Kokemuller, n.d.).
Point-of-sale (POS) terminals are a main component in retail store technology that is used in the front-end. This includes computer terminals and accessories (scanners, wands) for managing sale transactions. Payment processing equipment, including card machines are also important at the POS. Other store-centered technology includes inventory scanners used to update stock and adjust in-store pricing and security systems including cameras, monitors, closed-circuit TV, EAS tags and the like. Timekeeping systems are also used.

Back-end retail technology includes those items used behind-the-scenes for store operation. These are more relevant for chains as opposed to single-store operation. Inventory management solutions are connected with stores to manage inventory orders and replenishment. Warehouse or storage technology is used for shipping and receiving and order tracking. Enterprise-wide technology solutions have become more universal, thanks to the evolution of customer relationship management (CRM) and supply chain management (SCM). These are broad-based programs that relate to optimization of the customer experience and efficiency in partnerships. CRM technology includes POS data collection software that flows to databases held by the retailer or a third-party host. CRM solutions are used to operate customer loyalty or frequency programs. SCM solutions, which can often be integrated with CRM, are used to connect retailers to suppliers and partners to expedite inventory replenishment and other business transactions.

Description of the technologies used in retail stores are briefed in the following paragraphs.
3.2.1 POS Point of sale (POS) or checkout

POS refers to the area of a store where customers can pay for their purchases. The term is normally used to describe systems that record financial transactions. This could be a manual system, an electric cash register or an integrated computer system, which records the data that comprises a business transaction for the sale of goods or services. POS is simply the location where the sale is conducted, money changes hands and a receipt is given. For SME retailers, the POS will be customized by retail industry as different industries have different needs. For example, a grocery or candy store will need a scale at the point of sale, while bars and restaurants will need to customize the item sold when a customer has a special meal or drink request. The modern point of sale will also include advanced functionalities to cater to different verticals, such as inventory, CRM, financials, warehousing, and so on, all built into the POS software. Prior to the modern POS, all of these functions were done independently and required the manual re-keying of information, which resulted in a lot of errors.

3.2.2 Barcode and UPC

The Universal Product Code (UPC) is a barcode symbology (i.e., a specific type of barcode) that is widely used in retail stores for tracking trade items in stores. Its most common form, the UPC-A, consists of 12 numerical digits, which are uniquely assigned to each trade item. Along with the related EAN barcode, the UPC is the only barcode allowed for scanning trade items at the point of sale, per GS1 standards. UPC data structures are a component of GTINs (Global Trade Item Numbers). All of these data structures follow the global GS1 standards.
Each UPC-A barcode consists of a scannable strip of black bars and white spaces, above a sequence of 12 numerical digits. No letters, characters, or other content of any kind may appear on a standard UPC-A barcode. The digits and bars maintain a one-to-one correspondence - in other words, there is only one way to represent each 12-digit number visually, and there is only one way to represent each visual barcode numerically.

### 3.2.3 Digital Signage (Store Front)

Digital signage refers to a variety of technologies used to replace traditional retail signs. Instead of static print signs and billboards, digital signage is composed of electronic signs dispersing content and messages in the most targeted, interactive way. Advertising using digital signage is a form of out-of-home advertising in which video content, advertisements, and/or messages may be displayed on digital signs with a common goal of delivering targeted messages, to specific locations and/or consumers, at specific times. This is often called “digital out of home” or abbreviated as DOOH.

Since digital signage content may be both frequently and easily updated, saving the printing and/or construction costs associated with static signage, and also because of the interactive abilities available through the accompanying employment of such real-world interfaces as embedded touch screens, movement detection and image capture devices, it has won wide acceptance in the marketplace. Advanced technologies are being used in store front digital signage. NEO’s Nuremberg store location features an interactive digital signage storefront that enables shoppers to use their smartphones to browse for the latest fashions by Adidas without using an app or scanning a QR code. The new storefront window is a fully functioning virtual store. Shoppers interact with the interactive storefront by
touching hotspots on the window that provide additional product details and then they're able to purchase items directly using their smartphone

### 3.2.4 Electronic Point of Sale (EPOS)

Electronic point of sale systems (EPOS) are the computerised systems that are used by retailers: modern tills and associated systems. Their basic functions include scanning bar codes or radio frequency ID (RFID) tags to identify products, scanning credit cards, and cash handling. EPOS can also connect with the customer’s smartphone, tablet, laptop, or mobile. EPOS systems do not only handle transactions. They can also connect to networks making information on sales instantly available. This is useful for providing management with information for decision making, and for improving logistics and stock control. Stock control improves because with exact sales data a retailer knows exactly how much of any given item is available at any given locations as well as how fast items are selling at each location. This means less working capital is required, while at the same time the chances of running out of any item can be reduced. Large retailers tend to have very sophisticated logistics systems and the data from EPOS systems is a vital to these.

### 3.2.5 In-Store Digital Signage

Retail customers today want access to products, information, trusted opinions, and deals, regardless of whether they are shopping online, in a store, or both. Retailers now can deliver interactive, immersive cross-channel shopping experiences that give their customers the convenience of online shopping in the store. Digital signage is a form of electronic display that shows television programming, menus, information, advertising and other messages. Digital signs (frequently utilizing technologies such as LCD, LED, plasma displays, or projected imagesto display content) can be
found in both public and private environments. Digital signage enables a retailer to control and display their messages quickly and effectively. Creating a digital signage system involves building a network of electronic devices that are controlled remotely from a central location. These devices present information via digital signage software to a targeted audience. Digital signage devices in the network may be plasma or LCD monitors, kiosks, projection displays, HDTVs or other electronic devices.

Using digital signs in a retail environment has many features and benefits not offered by static displays and signage. Dynamic digital signage can grab a customer’s attention and influence their purchasing decision right at the point of purchase. It also eliminates the high cost of creating and distributing print ad campaigns. Digital signage is instant and offers the ability to change promotions immediately for various products or particular customers. Another advantage of digital displays over static is that retailers can earn money with their digital signage network by selling advertising space to their suppliers. Whether it is intended to build a brand, influence customer behavior or simply provide information, the dynamic visual experience created by digital signage should ultimately increase sales. In order to achieve that goal, retailers will need to design the appropriate system (Shari Waters, n.d.).

3.2.6 Kiosk Technology

Self-service ordering kiosks are computerized touch pads that enable customers to order made-to-order sandwiches more efficiently than by speaking with a counterperson. The system is simple to use and offers custom choices. If the buyer desires extra mayonnaise, the sandwich can be ordered as such. In a typical c-store, customers begin at the ordering kiosk, walk throughout the store to shop for additional items, pick-up the sandwich and end at the cashier. More recently, supermarket shoppers use self-service
checkout kiosks, gas-buyers pay-at-the-pump, airline passenger’s check-in at self-service kiosks and business traveler's check-out using hotel kiosks. Convenience store chains like Wawa and Sheetz have been using self-service kiosks for their foodservice programs for years with extraordinary success, and chains like Rutter’s Farm Stores and White Hen Pantry have since followed suit.

Today, the reliability issues have been addressed, and the general population has become computer savvy. The result is the overwhelming majority of customers consider kiosks to offer a superior ordering process compared to the old way. There are also multiple benefits on the store-side. It doesn't matter if you have a high-end store getting higher margins or if you have a bare bones store making pennies on the dollar, you must be operationally efficient. Self-service ordering kiosks enable efficiency while providing an attractive return on investment (ROI).

The benefit of kiosk to the customers is that its very nature of self-service ordering compels them to meet specific consumer expectations. Consumers appreciate not having to shout their order out so everyone can hear. Kiosks remove their potential embarrassment and provide privacy. Kiosks give consumers proactive confidence. Everyone has experienced the dreadful wait at a delivery counter either trying to get the attention of someone behind a counter or waiting for a number to be called. Kiosks remove all that unnecessary anxiety. Consumers don't need to be computer savvy, because kiosks don't require any particular training or intelligence to use. In fact, many people are more comfortable interfacing with technology than they are talking face-to-face with an order clerk. Whether the cause is a language barrier or the din in the store, kiosks can't misunderstand an order. This enhances the shopping experience for consumers because they never feel the frustration of not being able to communicate their needs. The
consumer gets exactly what they order. The touch pad all but ensures their needs will be met.

The Kiosk technology also has benefits to Storeowners. Storeowners and managers enjoy two main benefits from kiosk deployments. First, they can use kiosks as a tool to streamline their operation. Second, they realize an ROI in a reasonable period of time. Upon closer inspection, their benefits are many. Kiosks enable to maximize productivity by limiting time previously spent in conversation and data entry. Multiple kiosks can take orders simultaneously. From the store’s point-of-view, this is the most important reason to deploy the technology. The complaint, "This is not what I ordered," is virtually never heard. There is a small margin for human error, but it is dramatically diminished compared to the potential for error before kiosks. Employees are free from interacting with customers and can focus on the producing and delivery the service effective. Earlier in service encounter the employees were required to have the people skill along with thier trade skills. Employees who found difficulty in interacting were not given opportunity. With kiosk technology in place, the store can employ with good trade skills rather than people skills. The kiosk will offer up-sell choices to customers more frequently than the average counterperson. For the counterperson, up-selling is a learned behavior. For the computer it is automatic. More advanced systems can provide the store with reports on inventory and worker productivity. Some systems can monitor individual employee performance.

3.2.7 Plan-o-gram

Presentation of product plays an important role at the retail store. Planograms are similar to architectural drawings and help the retailer to understand where the merchandise should be stocked in order to catch the customer’s attention and make the maximum impact. A retailer can make the best possible use of the available space with the help of planograms. The
merchandiser can actually create an attractive display to entice the customers with the help of planograms. Planograms indirectly also contribute in maximizing the sale of the merchandise and thus generate revenues for the store. A cluttered store fails to attract the customers. The planograms help the retailer to arrange the products in the best possible way for the customers to pick up almost everything. A Plan-o-gram ideally should be prepared before the merchandise reaches the retail store. The retailer should be very clear where he wants to place his products to impress the customers. There are various softwares available which help to create planograms. These softwares help the retailers to draw three dimensional diagrams of the store and help them visualize the overall image of the store.

Visual Product Placement refers to a technique where the products are placed in a way to immediately catch the attention of the customers walking into the store. There are different types of Visual Product Placement. In Horizontal Product Placement, products are placed side by side on shelves to offer a wide range of options to the customers. In Vertical product placement displays the merchandise on more than one shelf level. According to block placement of products, the related products or merchandise belonging to a similar family are stocked at one place together under one common umbrella. Commercial product placement takes into account the brand value of the merchandise. Every customer has a perceived image of the merchandise which decides its placement in the store. A product which has several takers would definitely get the best position as compared to something which does not contribute much to the revenue of the store. Market share product placement plan works on a simple strategy in which a product which generates the maximum revenue for the store should ideally be placed at a prime location for the customers to notice it and immediately buy it. According to Margin product placement, the more a product earns profit for the retailer, the better the location it is placed.
3.2.8 Portable Data Terminals (PDT) and Hand Held Computers

A portable data terminal, or PDT, is an electronic device that is used to enter or retrieve data via wireless transmission (WLAN or WWAN). They can also serve as barcode readers, and they are used in large stores, warehouses, hospitals, or in the field, to access a database from a remote location. PDT’s frequently run wireless device management software that allows them to interact with a database or software application hosted on a server or mainframe computer. A mobile device (also known as a handheld device, handheld computer or simply handheld) is a small, hand-held computing device, typically having a display screen with touch input and/or a miniature keyboard and weighing less than 2 pounds (0.91 kg). Apple, HTC, LG, Research in Motion (RIM) and Motorola are just a few examples of the many manufacturers that produce these types of devices. A handheld computing device has an operating system (OS), and can run various types of application software, known as apps.

Most hand held devices can also be equipped with WI-FI, Bluetooth and GPS capabilities that can allow connections to the Internet and other Bluetooth capable devices such as an automobile or a microphone headset. A camera or media player feature for video or music files can also be typically found on these devices along with a stable battery power source such as a lithium battery. Early pocket sized ones were joined in the late 2000s by larger but otherwise similar tablet computers. As in a personal digital assistant (PDA), the input and output are often combined into a touch-screen interface. Smartphones and PDAs are popular amongst those who wish to use some of the powers of a conventional computer in environments where carrying one would not be practical. Enterprise digital assistants can further extend the available functionality for the business user.
3.2.9 RFID

Radio Frequency Identification in the retail industry has solved major problems related to customer services. With the help of RFID it becomes easy for the sales staff to locate a particular item in the store and check its availability in less time. It’s a data collection technology that uses electronic tags for storing data. The tag, also known as an “electronic label”, “transponder” or “code plate” is made up of an RFID chip attached to an antenna. Transmitting in the kilohertz, megahertz and gigahertz ranges, tags may be battery-powered or derive their power from the RF waves coming from the reader. Like bar codes, RFID tags identify items. However, unlike bar codes, which must be in close proximity and line of sight to the scanner for reading, RFID tags do not require line of sight and can be embedded within packages. Depending on the type of tag and application, they can be read at a varying range of distances. In addition, RFID-tagged cartons rolling on a conveyer belt can be read many times faster than bar-coded boxes.

**RFID** in retail helps in the following ways:

(a) Improves the level of customer service
(b) Increases customers loyalty
(c) Better Inventory Management
(d) Item level tracking

The future of RFID is very bright in retail sector, as right from inventory management to product manufacturing, this system provides a
more efficient and advanced retail experience to both the customer and the seller.

3.2.10 Store Traffic Counters

For retailers, one of the most important new technologies of the 21st century is a relatively simple electronic device: the store traffic counter. Traffic is counted entering and leaving a store using one or more types of motion detector. This number is compared to the number of sales transactions during the same period, which produces a conversion rate. People Counting Systems or “Foot traffic counters” provide valuable data about customer traffic numbers entering your retail store. An overhead sensor is installed at each customer entry point and accurately counts customers, even those in groups. The devices are connected to a computer or Server and offer a state of the art reporting system that provides detailed visitor traffic analysis. People counting systems can compare data from your point-of-sale system with an accurate people count and generates traffic and sales conversion statistics providing management with instant feedback from sales strategies and in-store promotions.

Without a traffic counter, store managers can explain flat sales results by claiming “there was no traffic”. With a traffic counter, management can identify very large numbers of people who left the store without making a purchase and seriously question why they didn’t. There will always be people who leave the store without buying because they were “just browsing” or because the store doesn’t have the right size, colour, item, etc. These are also the hours that experience the highest number of walk outs, or people leaving the store without making a purchase. By identifying these periods and documenting the number of “buying” traffic that is not buying.
stores can significantly reduce the number of walkouts. A traffic counter is a relatively inexpensive device, uses traffic and staff already in the stores to produce results, and can generate increased sales within 4 weeks of installation. (Michael Bunyar, 2011).

3.2.11 Surveillance & Security

Retailing today is a tough business and store owners face many challenges. The most obvious of these are theft and inventory shrinkage that eats into the stores’ profits. Retailers now benefit from store protection methods including CCTV systems, which can record criminal activity in stores, as well as tagging systems, placed by shop entrances, which alert staff to thefts. Retail surveillance using network video solutions such as IP cameras is an excellent weapon in the battle to protect your business. By deterring crime, it reduces losses and creates a safer environment for staff and customers. The key difference between traditional CCTV and network video surveillance is that a network system is IP-based. In other words, surveillance images are captured and distributed over an IP network. Shop owners, managers and security experts can therefore monitor these images from their desks or indeed any location with an Internet connection. They can even monitor several retail outlets at the same time. Recorded images are usually stored remotely or in the shop itself.

Going beyond security and loss prevention, enhanced video surveillance systems are serving a broader set of business objectives associated with store operations and marketing. These systems incorporate anonymous video analytics and deliver key performance indicators (KPI) in real-time across departments, stores and regions. After gathering this information, retailers can optimize store layouts, measure promotional
program effectiveness and provide better customer service, among other things. Today’s retailers base their merchandising and operations on hard facts, but to get these hard facts they first need to make sense of the data from multiple systems and sites. Network video makes it easier to extract the information you need and boost your stores’ performance. Strategically placed network cameras can give you valuable insights into customer behaviour, help you ensure customer satisfaction and improve your marketing results. For example, you can record and measure customer activity and buying behavior, and optimize your store layout accordingly.

Network cameras in intelligent systems can spot empty shelves and alert appropriate staff to get them restocked. You can monitor queues, and re-deploy staff where they are most needed. Evaluating marketing efforts is quick and easy with network video, because you can see for yourself what promotions work best, and where. Video analytics is increasingly demanded in retail or shop security surveillance nowadays. The video analytics enables traffic measurement and monitoring, makes sales conversion evaluable, and enhances service and employee rewards.

3.2.12 Retail Accounting Software

The importance of information technology in retail stems from the importance of data. The right data, in the right form to the right setoff people at the right time, is one of the greatest tools in the hands of the retailer. Information is always with reference to a particular time frame. Accounting software is application software that records and processes accounting transactions within functional modules such as accounts payable, accounts receivable, payroll, and trial balance. It functions as an accounting information system. Accounting systems for retail operations are more than
just point of sale systems. An integrated retail accounting software system provides a suite of tools designed to make your retail operation more efficient, easier to manage, and more profitable. With the right software technology you'll be able to increase margins with better inventory control and generate additional sales due to suggestion selling, staff performance tracking, and targeted marketing. A complete retail accounting system will include modules offering functionality for both the sales floor and the back office. Typical accounting applications include accounts payable, general ledger, and payroll. Inventory control, purchasing, and point-of-sale modules provide additional functionality designed to manage the acquisition, tracking, and sales of the products you offer to your customers.

3.2.13 Inventory Control Software

An inventory control system uses barcode technology to automate the tracking of merchandise. An inventory control system is a set of hardware and software based tools that automate the process of tracking inventory. The kinds of inventory tracked with an inventory control system can include almost any type of quantifiable good, including food, clothing, books, equipment, and any other item that consumers, retailers, or wholesalers may purchase. Modern inventory control systems are almost exclusively based on barcode technology. Though barcodes were initially developed to automate the process of grocery store checkout, their ability to encode a wide variety of alphabetic and numeric symbols makes them ideal for encoding merchandise for inventory applications. Inventory control systems work in real-time using wireless technology to transmit information to a central computer system as transactions occur.
Inventory control systems are employed in a wide variety of applications, but they all revolve around tracking delivery of goods to customers. Inventory control is crucial in retail stores, especially those with a large number or variety of merchandise items for sale. Inventory control is also used in warehouses to track orders and shipments, and for automated order processing. Other important applications of inventory control systems are in manufacturing, shipping, and receiving. Inventory control is important to ensure quality control in businesses that handle transactions revolving around consumer goods. Without proper inventory control, a large retail store may run out of stock on an important item. A good inventory control system will alert the retailer when it is time to reorder. Inventory control is also an important means of automatically tracking large shipments. An automated inventory control system helps to minimize the risk of error. In retail stores, an inventory control system also helps track theft of retail merchandise, providing valuable information about store profits and the need for theft-prevention systems.

Automated inventory control systems work by scanning a barcode either on the item. A barcode scanner is used to read the barcode, and the information encoded by the barcode is read by the machine. This information is then tracked by a central computer system. For example, a purchase order may contain a list of items to be pulled for packing and shipping. The inventory control system can serve a variety of functions in this case. It can help a worker locate the items on the order list in the warehouse, it can encode shipping information like tracking numbers and delivery addresses, and it can remove these purchased items from the inventory tally to keep an accurate count of in-stock items. All of this data works in tandem to provide businesses with real-time inventory tracking.
information. Inventory control systems make it simple to locate and analyze inventory information in real-time with a simple database search (http://www.barcodesinc.com/articles/inventory-control-system.htm).

3.2.14 Electronic Data Interchange (EDI)

Communication within the organization can be faster with the use of software like Lotus Notes. Retail stores can also communicate with each other and with the warehouses. This can be done 24 hours a day and seven days a week. Electronic Data Interchange (EDI) can also be used for communication with suppliers and vendors. Electronic Data Interchange (EDI) is the computer-to-computer exchange of business documents in a standard electronic format between business partners. By moving from a paper-based exchange of business document to one that is electronic, businesses enjoy major benefits such as reduced cost, increased processing speed, reduced errors and improved relationships with business partners.

EDI replaces postal mail, fax and email. While email is also an electronic approach, the documents exchanged via email must still be handled by people rather than computers. Having people involved slows down the processing of the documents and also introduces errors. Instead, EDI documents can flow straight through to the appropriate application on the receiver’s computer (e.g. the Order Management System) and processing can begin immediately.
A typical manual process looks like this, with lots of paper and people involvement:

Figure 3.1 Typical Manual Process

The EDI process looks like this: no paper, no people involved:

Figure 3.2 EDI Process
The most common documents exchanged via EDI are purchase orders, invoices and Advance Ship Notices. But there are many, many others such as bill of lading, customs documents, inventory documents, shipping status documents. Because EDI documents must be processed by computers rather than humans, a standard format must be used so that the computer will be able to read and understand the documents. A standard format describes when each piece of information is and in what form (e.g. integer, decimal, mmddyy). Without a standard format, each company would send documents using its company-specific format and, the receiver’s computer system doesn’t understand the company-specific format of the sender’s format. There are several EDI standards in use today, including ANSI, EDIFACT, TRADACOMS and XML. And, for each standard there are many different versions, e.g. ANSI 5010 or EDIFACT version D12, Release A (http://www.edibasics.co.uk/what-is-edi/).

EDI is now a standard practice in retail. That means manufacturers who sell their products at retail are certainly doing it with EDI as part of the mix. Larger retailers must continue to find ways to improve the performance of their EDI systems as the nature of their supply chains and operations become more complex. Meanwhile, small and mid-sized retailers must now also introduce EDI into their business models to stay competitive. Other key roles for EDI in Retail are in the streamlining of Direct Store Delivery (DSD) procedures and the drive towards Global Data Synchronisation. The retail industry was one of the first to automate its orders and invoices. More recently, the struggle has been for retailers to accommodate increased delivery frequencies and increased SKU counts offered by Direct Store Delivery (DSD) suppliers. Using EDI to automate the DSD process can relieve congestion at the retailer’s back door and reduce check in times.
However, for this process to be successful there needs to be effective Global Data Synchronisation (GDS) across the supply chain. Suppliers need to be able to maintain a fully aligned master file at an item level in order to facilitate the exchange of item information, authorisation, cost, price and promotion information. With GDS, retailers can readily identify discrepancies, unauthorised items that were delivered and differences between orders and deliveries.

3.2.15 CUSTOMER RELATIONSHIP MANAGEMENT (CRM)

Retailers find it increasingly difficult to maintain records of their rapidly growing number of consumers. Managing customer data so that there is optimal visibility for profiles, communications, services and analytics is always a challenge. Analysis of data from multiple systems for campaigns, sales, service and communications is unavailable on a single interface. Therefore, forecasting demand, buying habits and expenditure are time consuming and often inaccurate. Tracking request, queries, feedback, complaints and surveys from customers across multiple geographies are difficult to track. In addition, memberships, rules, accruals, profiling and segmentation for loyalty programs are often scattered and not available at a centralized location. CRM in Retail makes continuous customer engagement easy to achieve through multiple sales, services, marketing, product, loyalty and training management options. CRM solution for Retail helps to create a single interface to view real-time customer data and manage in-store, online and outdoor activities. CRM boosts sales and services for retailers through optimized pricing, product bundling, satisfaction scoring and demand forecasting.
3.2.16 Websites & Shopping Carts

Multichannel retailing is the merging of retail operations in such a manner that enables the transacting of a customer via many connected channels. Channels include: retail stores, online stores, mobile stores, mobile app stores, telephone sales and any other method of transacting with a customer. Transacting includes browsing, buying, returning as well as pre and post sale service. While emerging technology has been a key enabler, multichannel growth is essentially driven by consumers. According to Shop.org, 34% of consumers today use at least three channels when shopping. Research has found them to spend up to 10 times more, to generate 25 to 50% more profit and demonstrate greater loyalty than their single-channel counterparts. The core driver then is customer demand. The other major driver is cost saving through efficiency and effectiveness. Managing channels separately may not only impair customer relationships but also result in cost increases resulting from running separate order-management and customer service operations, multiple warehouses and fulfilment systems, and buyers and merchandisers duplicating effort across the different channels.

Multi-channel is also driven by strategic competitive advantage and differentiation opportunities, and regulatory pressures around ensuring that all customers are able to access products and services on offer. 85% of Internet users are also Internet shoppers, according to “The Interactive Consumer: Charting the Online Shopping Revolution,” commissioned by Parade Magazine. Today most retail businesses have a website for their company. If the retail company want to expand, then their marketing strategies should include a retail website (Renae De Leon). e-tailing or e-retailing refers to the selling of retail goods electronically over the Internet. The term is a short form for “electronic retailing”, and surfaced in
the 1990s for being frequently used over the Internet. The term is an inevitable addition to other similar terms such as e-business, e-mail, and e-commerce. E-tailing usually refers to the business-to-consumer (B2C) transactions. E-tailing is gaining ground. In the year 2009, clothing and apparel segment clocked online revenues to the tune of $ 19.5 billion. Online retailing is classified into three main categories:

1. Click – The businesses that operate only through the online channel fall into this category. Prominent examples in this category include: Dell, Amazon.com and e-Bay.

2. Click and Brick – The businesses that use both the online as well as the offline channel fall into this category. Common example includes: Barnes and Noble's.

3. Brick and Mortar – This is the conventional mode of retailing. The businesses that do not use the latest retailing channels and still rely upon the conventional mode belong to this category.

e-tailing offers the consumers huge amounts of information in the form of web sites with useful links to similar sites that allows consumers to compare products by looking at individual items. The convenience of online shopping is unmatched indeed. Shopping out of your home or office reduces the stresses of waiting in lines and dealing with irritating sales people. However, E-tailing causes problems with fit, since the consumer cannot try the items on. Return policies may also act as turn offs and items can be difficult to return. The shipping and handling costs may turn the customers away. e-tailing requires technology savvy customers and this puts a limit on its potential reach. We can see that E-tailing is emerging as an interesting phenomenon in the retail industry that is on a rise despite the disadvantages associated with it.
In e-tailing or online marketing, a shopping cart is a piece of e-commerce software on a web server that allows visitors to an internet site to select items for eventual purchase, analogous to the American English term “shopping cart”. In British English it is generally known as a shopping basket, almost exclusively shortened on websites to ‘basket’. The American Marketing Association defines shopping cart as “software used to make a site's product catalogue available for online ordering, whereby visitors may select, view, add/delete, and purchase merchandise”. The software allows online shopping customers to accumulate a list of items for purchase, described metaphorically as “placing items in the shopping cart” or “adding to cart”. Upon checkout, the software typically calculates a total for the order, including shipping and handling (i.e. postage and packing) charges and the associated taxes, as applicable.

3.3 Application of RFID in retail operations

RFID stands for Radio-Frequency IDentification. The acronym refers to small electronic devices that consist of a small chip and an antenna. The chip typically is capable of carrying 2,000 bytes of data or less. There are various definitions for the term “Radio Frequency Identification”. AIM Inc., Association for Automatic Identification and Data Capture Technologies, Pittsburgh, gives a simple and accurate definition for RFID as, “RFID is an automatic way to collect product, place, time, or transaction data quickly and easily without human intervention or error”. (www.aimglobal.org).

An RFID system comprises a reader, its antenna and transponders (tags, RFID cards) that carry the data. The reader transmits a low-power radio signal through its antenna, which is received by the tag via its own antenna and used to power an integrated circuit (chip). Using the energy it gets from the signal when it enters the radio field, the tag will briefly converse with the reader for verification and exchange data. Once the data is
received by the reader, it is then sent to a controlling computer for processing and management. The RFID device serves the same purpose as a bar code or a magnetic strip on the back of a credit card or ATM card; it provides a unique identifier for that object. And, just as a bar code or magnetic strip must be scanned to get the information, the RFID device must be scanned to retrieve the identifying information.

3.3.1 RFID Technology – a history

RFID technology was at first developed for military at World War II, and then it has long-drawn-out into retail, medical, culture, automotive, security, fast food as well as travel industries. In 1946 Léon Theremin invented an espionage tool for the Soviet Union which retransmitted incident radio waves with audio information. Sound waves vibrated a diaphragm which slightly altered the shape of the resonator, which modulated the reflected radio frequency. Even though this device was a passive covert listening device, not an identification tag, it is considered a predecessor to RFID technology. The technology used in RFID has been around since the early 1920s according to one source.

RFID is described as the “wireless bar coding”, in fact, basic RFID far exceeds the bar coding abilities. The bar code-based tracking scheme is narrow to gross categorization and is work intensive; items have to be manually examined one at time. The RFID systems are all self-powered and need no human interference. They can at the same time scan numerous items as well as provide fingerprint exact information about all. For instance, a bar code just identifies the item as can of soup. RFID tags distinguish that exact can from all other can of the soup and keep a complete account of movement from the point of manufacture to the point of purchase. (http://www.integrus.co.uk/references/rfid-04-05-08.php)
3.3.2 Technology

Basically an RFID system consists of three components: An antenna or coil, a transceiver (with decoder) and a transponder (RF tag) electronically programmed with unique information.

Figure 3.3 Components of RFID system

The antenna emits radio signals to activate the tag and to read and write data to it. The reader emits radio waves in ranges of anywhere from one inch to 100 feet or more, depending upon its power output and the radio frequency used. When an RFID tag passes through the electromagnetic zone, it detects the reader's activation signal. The reader decodes the data encoded in the tag's integrated circuit (silicon chip) and the data is passed to the host computer for processing. RFID tags come in three general varieties: passive, active or semi-passive (also known as battery-assisted). Passive tags require no internal power source (they are only active when a reader is nearby to power them), whereas semi-passive and active tags require a power source, usually a small battery.

Passive tags

Passive RFID tags have no internal power supply. The minute electrical current induced in the antenna by the incoming radio frequency signal provides just enough power for the complementary metal-oxide-
semiconductor (CMOS) integrated circuit in the tag to power up and transmit a response. Most passive tags signal by backscattering the carrier wave from the reader. This means that the antenna has to be designed both to collect power from the incoming signal and also to transmit the outbound backscatter signal.

**Active tags**

Unlike passive RFID tags, active RFID tags have their own internal power source, which is used to power the integrated circuits and to broadcast the response signal to the reader. Communications from active tags to readers is typically much more reliable (i.e. fewer errors) than from passive tags due to the ability for active tags to conduct a “session” with a reader.

**Semi-passive tags**

Semi-passive tags, also called semi-active tags, are similar to active tags in that they have their own power source, but the battery only powers the microchip and does not power the broadcasting of a signal.

### 3.3.3 Application

There are some benefits of radio frequency identification technology that can be functional at quite a few levels, and it makes sure improved message and competence. It can also be used to recognize, as well as spot known substance or person and can be used in list management, quality tracking, safety and loss avoidance, conservation, hire equipment, as well as operations These are some benefits of RFID that can be used in many field here are given few more. RFID technology doesn’t need reading line of sight access. The RFID tag can make active security alarm, if removed from the correct place, and it is not the orientation sensitive. As well, it can hold further information than just an exclusive product code, and, therefore, every
item can be separately labeled or else tagged. In addition, RFID tag information is comprehensive, characteristic or ordinary in parts, and is well matched with data processing. And with right skill, plurality of tags can also be read at same time. RFID tag has two kinds - read-only as well as read-write. Both RFID tag is separate, and therefore, these tags can take action as security mark if misplaced or stolen.

RFID technology has extremely sophisticated height of data honesty in form of character test sum encoding, as well as it provides the excellent safety and goods authentication. RFID tag is harder to forge than barcode. Not only that, supporting data communications can make easy data revival as well as product tracking anyplace. RFID technology has a capability to check shelf life that is particularly advantageous in pharmaceutical as well as food industries. The association between RFID technology as well as ID cards is very close and private. While types of recognition function extremely well independently, their efficiency together is remarkable. For instance, while it is imaginable that the best ID cards can also be fake, or else lost and utilized by dishonest individuals, card using RFID technology presents numerous protections. If the card is lost, however the RID tag, it can simply be tracked. While this might not lead to anxiety of individual who initially took it, it can lead to card itself, plus any damages can then be upturned.

Another, easier means that RFID technology assist in use of ID cards is through readers, strongest of that can scan the information to thirty meters or further away. This moves the tedium of physical reader as well as allows people in area to make use of the system further effectively. RFID is healthy technology as well as can be made use in intimidating surroundings. It has supplies for normal upgrading, for instance, as car goes through the life, its service proof can be logged with car by the electronic means. The day-to-
day instance in which this skill can benefit by RFID inserting it into the suit thus when it is sent to the cleaners, it mechanically finds right cleaning technique to be used. There exists the program, called RFID pilot program that provides the low-risk come up for determining likely necessities, procedure changes, costs, proceeds, impact, and dangers of implementing RFID in the real world client environment. This is some benefit of RFID Technology. (http://www.integrus.co.uk/references/rfid-05-05-08.php).

**Asset Tracking**

It’s no surprise that asset tracking is one of the most common uses of RFID. Companies can put RFID tags on assets that are lost or stolen often, that are underutilized or that are just hard to locate at the time they are needed. Just about every type of RFID system is used for asset management. NYK Logistics, a third-party logistics provider based in Secaucus, N.J., needed to track containers at its Long Beach, Calif., distribution center. It chose a real-time locating system that uses active RFID beacons to locate container to within 10 feet.

**Manufacturing**

RFID has been used in manufacturing plants for more than a decade. It's used to track parts and work in process and to reduce defects, increase throughput and manage the production of different versions of the same product.

**Supply Chain Management**

RFID technology has been used in closed loop supply chains or to automate parts of the supply chain within a company’s control for years. As standards emerge, companies are increasingly turning to RFID to track shipments among supply chain partners.
Retailing

Retailers such as Best Buy, Metro, Target, Tesco and Wal-Mart are in the forefront of RFID adoption. These retailers are currently focused on improving supply chain efficiency and making sure product is on the shelf when customers want to buy it.

Payment Systems

One of the most popular uses of RFID today is to pay for road tolls without stopping. These active systems have caught on in many countries, and quick service restaurants are experimenting with using the same active RFID tags to pay for meals at drive-through windows.

Security and Access Control

RFID has long been used as an electronic key to control who has access to office buildings or areas within office buildings. The first access control systems used low-frequency RFID tags. Recently, vendors have introduced 13.56 MHz systems that offer longer read range. The advantage of RFID is it is convenient (an employee can hold up a badge to unlock a door, rather than looking for a key or swiping a magnetic stripe card) and because there is no contact between the card and reader, there is less wear and tear, and therefore less maintenance.

3.3.4 Retail Applications

Retailers today require the ability to accurately and quickly collect transaction data in order to ensure the operational efficiency of checkout. This operational efficiency translates into a faster checkout experience for customers, which enhances their shopping experience, while reducing costs.
Despite a common checkout, each retail store format varies in:

- Checkout model,
- Data collection needs and
- Technological requirements

3.3.5 Problems

Radio frequency identification, or RFID, technology has found use in many different applications. RFID has found use in a variety of industries for the tracking of inventory, resources, tools, manufacturing, payment systems, retailing and access control. Stores use RFID tags to track inventory, and government offices use it to encode identification data in important documents. Milton Kazmeyer, (2012) & Sam Spurlin, (2012) discussed about the advantages and disadvantages of using RFID. The technology's flexibility allows it to be used in many different capacities. While RFID tags offer considerable advantages over other tracking systems, they also have weaknesses that third parties can exploit, and disadvantages that you should take into consideration before adopting this technology. The disadvantages must be carefully considered before implementation.

Ease of Use

Businesses that replace bar code scanners with RFID systems gain a significant advantage, because bar codes require the user to point the scanner directly at each code scanned, while RFID scanners can activate multiple tags at once and do not require line-of-sight to each tag. A user can scan an entire box of products without opening the package, or scan the contents of a shopping cart without having to remove each item and pass it over a scanner.
Range

While passive RFID tags only have a range of a few meters, active tags use an internal power source that can boost the range and allow them to transmit over a period of time and not just when scanned. This can allow users to set up fixed RFID receivers, and track the contents of an entire building, for example, at once. Paired with a more powerful transmitter, RFID technology can track items, people or even tagged animals over a large area.

Expense

An RFID system requires the purchasing of tags, readers and a software infrastructure. Depending on the size of the company, this can be very expensive and time-consuming. According to RFIDJournal.com, RFID tags can cost between 7 and 15 cents apiece, depending on the type. Not only are individual tags expensive, the readers can cost from a couple hundred dollars to several thousand. Implementing an RFID system requires purchasing and restructuring at almost every level of a company, which is never an inexpensive endeavor.

Interference

Devices such as forklifts and walkie-talkies in the vicinity of an RFID system can interfere with its functionality. As RFID uses radio frequency to transit and read information, any device that also uses this part of the electromagnetic spectrum could cause problems in an RFID system. In cases of interference, tags have been reported to be read more than once or not at all.
**Damage**

Tags must be physically attached, injected or otherwise fixed to the products they represent. They contain electrical components, so conditions that generally cause problems with other electronic devices, water, static discharge, lightning strikes and high-powered magnets can pose problems for RFID systems.

**Lack of an International Standard**

The United States and Europe allow for a different range of frequencies to be used for RFID systems. International companies must be aware of the working conditions in each country they conduct business. Making sure an RFID system is compatible across international lines can be expensive and time-consuming.

**Privacy Concerns**

As RFID systems become less expensive and more sophisticated, issues of privacy have risen to the surface. The covert nature of RFID scanning and the ability to embed tags in almost any product means that consumers may not know when companies are monitoring their shopping habits or even movements. Concerns are tied to the worries that individuals could be tied to specific information regarding their purchasing history. The advocacy group Consumers against Supermarket Privacy Invasion and Numbering (CASPIAN) cites concerns around the trafficking of people's personal data collected through RFID technology. Companies can aggregate RFID data to harvest data about people without their consent, and if cashiers do not disable tags at the point of purchase, they can continue tracking consumers long after they leave the store.
Security

The fact that an RFID tag responds to a signal of the proper frequency means that anyone capable of generating that signal can read the information from the tag. This can allow third parties to easily access the information encoded in an RFID tag, and use that data for their own purposes. Furthermore, the long-range nature of RFID technology allows users to access data at a distance and covertly, so the target of the information theft might not even be aware it has happened. Encrypting data stored in RFID tags can help prevent this kind of attack.

3.4 CONCLUSION

This chapter described the fundamental concepts of retailing and described the application of various technologies in the retail operations. The chapter also elaborated the technology of RFID and its application in retail business. The analysis of the various concepts proposes that the retailers need to understand that technology is not a sunk cost but rather an investment to reduce heavy long-term costs. It is an investment to maintain competitive advantage for long-term growth.