RFID in Retail

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Retailers bring a multitude of manufacturers and consumers together on a single platform making it possible for products to be sold and business to take place. Retail is the final link in the chain between consumers and manufacturers and plays a vital part in the business world. Retailers add value to products by making it easier for manufactures to sell their merchandise and consumers to buy them. Retailing is one of the largest industries in the world in both number of establishments and number of employees.

Retail Market Size
The Global Retail Industry

Retail has played a major role world over in increasing productivity across a wide range of consumer goods and services. It is also one of the largest world wide. The impact can be best seen in countries like U.S.A., U.K., Mexico, Thailand and more recently China. Economies of countries like Singapore, Malaysia, Hong Kong, Sri Lanka and Dubai are also heavily assisted by the retail sector.

United States

Retail is the second-largest industry in the United States both in number of establishments and number of employees. The retail industry employs more than 22 million Americans and generates more than US $3.8 trillion in retail sale annually, i.e. approximately $11,690 per capita. Retailing is a U.S. $7 trillion sector. Retail trade accounts for about 12.9 percent of all business establishments in the United States.

Wal-Mart is the world's largest retailer. Already the world's largest employer with over 1 million associates in the US and another 300,000 worldwide. Wal-Mart displaced oil giant Exxon Mobil as the world's largest company when it posted $219 billion in sales for fiscal 2001 and US $ 313 Billion in 2006. Wal-Mart has become the most successful retail brand in the world due its ability to leverage size, market clout, and efficiency in its SCM among other things to create market dominance. Wal-Mart was also the market leader in implementing RFID. Wal-Mart heads Fortune magazine list of top 500 companies in the world. Forbes Annual List of Billionaires has the largest number (45/497) from the retail business.

India

Retail is India's largest source of employment after agriculture. It has the deepest penetration in rural India, and generates more than 10% of India's GDP (Source: FICCI – ICICI Property Services Study Feb. 2005). With close to 12 million retail outlets, India has the highest retail outlet density in the world.

The majority of the retail market continues to be unorganized. At present the organized sector accounts for only 2 to 4 percent of the total market, although the Economist Intelligence Unit (EIU) forecasts that on current trends that will rise to between 20 and 25 percent by 2010. The level of retail sales per head remains one of the lowest in Asia.

The share of organized retail in India was about 0.7% (US $1.1) in 1999, has increased to 3.2% (US $ 7 Billion) of the total US $ 225 Billion pie, in 2005. The Indian retail sector is worth roughly $292 Billion, and roughly 5% of this is classified as organized retail. Of the 12 million stores in India almost 95% are less than 500 sq. ft in area. The Indian advantage is that it is amongst the least saturated of all major global markets in terms of penetration of modern retailing formats. A Study conducted by AT Kearney on global retailing (July, 2005) trends found that India is the least competitive, as well as least saturated of all major global markets. India tops the annual list of most attractive countries for international retail expansion.

India is rated 1st in the GRDI Index published by AT Kearney which means India is the most favorable country for Retail development. The Retail Industry is moving towards Organized Retailing form Unorganized Retailing and at the same time moving from small Mom and Pop operations to large formats.

There are various mandates developing in the Retail Industry to which all the suppliers have to comply (Wal-Mart, Target, Tesco, etc.). Retailers face various problems like Stock Outs, Inventory Management, Recalls, Theft, Shrinkage, Customer Relations Management (CRM) and product Counterfeiting. Implementation of RFID can single handedly solve the above mentioned problems faced by the retailers.

"The future would have more and more business organizations access people, technology, funds and markets at par levels" The core differentiator that will define successful organizations of tomorrow will be getting relevant information in real-time. Organizations with critical and relevant real-time business information about their enterprise will be better equipped to face competition and emerge winners, said Mr. Kaushik Yegnan (MD/CEO) SkandSoft Technologies.

Introduction to RFID:

The Radio Frequency Identification (RFID) is a part of Auto Identification and Data Capture (AIDC) technology that was developed by the British during World War II as a tool to identify friend or foe (IFF). RFID is a proven technology that's been around for many years. But up until now, it has been too expensive to be practical for many commercial applications. It has come a long way in the last 50+ years and is now making inroads into everyday life.

The new age RFID/AIDC middle-ware's like SkandSoft Technologies SETU™ are more than just a bridge connecting the hardware to the enterprise software. They facilitate multiple Solution/ Application development like,

asset management, visitor management, document management, ePharma, warehouse management (WMS), supply chain management (SCM), etc. for multiple industry verticals like Retail, Pharma, Hospitals, Manufacturing, Logistics, Banking, etc. The Middleware can even enable feedback, through machine to machine (M2M) interaction. e.g., if an unauthorized movement is detected the system can notify a PLC to lock the access point. Further, these web-enabled solutions allow the Information to be configured, monitored and managed in Real-time from one central location irrespective of the distribution of physical location.
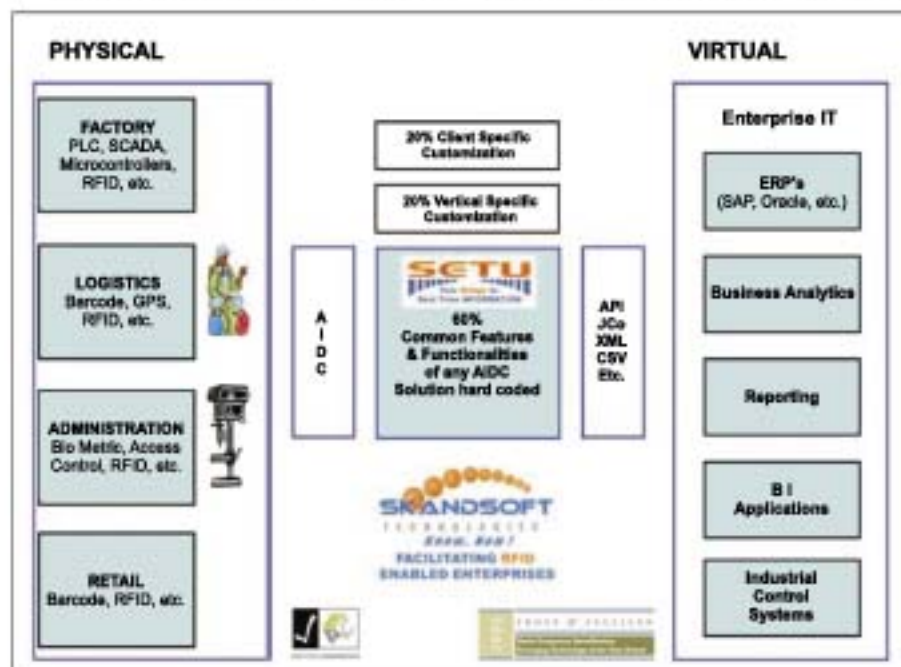
RFID technology can be used for

Identification & Location of tagged items like man & material. RFID is a matured technology and is highly accurate; RFID enabled indoor location systems can provide accurate location information from a few meters for a standard RFID-RTLS system to as accurate as 6 inches for the RFID UWB-RTLS (Ultra wideband Real-time location systems).

Radio frequency identification (RFID) devices cover a wide range of frequencies and applications.

Different frequencies have different characteristics that make them more useful for different applications.

Low-frequency (LF) RFID systems (30 KHz to 300 KHz) and **High-frequency (HF)** RFID systems (3 MHz to 30 MHz) also typically have short transmission ranging from generally a few inches, they are primarily used for Access Control and Security applications, Library books tracking, etc.

Ultra-high frequency (UHF) RFID systems (300 MHz to 1000 MHz) offers longer transmission ranging from several feet to more than 90 feet; they are

primarily used for Supply Chain (SCM), Airline Baggage tracking, etc.

Microwave frequency RFID Systems (1 GHz and above) also provide very long transmission ranging from several hundred feet or more, they are primarily used for highway toll tags, fleet management, yard management, etc.

The internet of things is here; with our capability of attaching an electronic identity to a physical object like man or material effectively extends the Internet (virtual world) into the physical world, turning physical objects into an "Internet of Things" just like in the movie AI (Artificial Intelligence). By doing this we no longer require the human interaction to track humans, animals, assets, products, goods in our house, etc. These real-time applications will be able to see, track and to some extent even control all items like man and material in the network as they are electronic tagged and the electronically connected physical environments.

RFID enables multiple solution/application development in areas like asset management, visitor management, document management, file management, ePharma, warehouse management (WMS), supply chain management (SCM), etc.

RFID based applications these days are limited only by people's imagination. RFID technologies offer practical benefits to almost anyone who needs to keep track of physical assets. Retailers use RFID to increase efficiency in their supply chains, to improve demand planning and in EAS (electronic article surveillance), which is another common use of RFID, typically seen in anti-theft products at the exits of retail or department store establishments. Machine shops track their tools with RFID to avoid misplacing tools and to track which tools touched a piece of work. RFID-enabled smart cards help control perimeter access to buildings.

Before you even think about changing an existing process, make sure you are aware of its strengths, weaknesses, and reasons for being in place. The way to go about planning for a new RFID deployment is "How can I improve the existing process with RFID?" and not "Where can I use RFID?"

RFID Standards for the Retail Industry:

EPCglobal Inc., a not-for-profit joint venture organization between GS1 (formerly EAN International) and GS1 US (formerly Uniform Code Council) created in 2003, is leading the development of Industry driven Electronic Product Code (EPC) standards to support the use of RFID and the associated EPC network. This will facilitate immediate, automatic and accurate identification of any item in the Supply Chain of any company, in any Industry, anywhere in the world.

EPCglobal is a member-driven organization composed of leading firms and industries that are focused on creating global standards for the EPCglobal Network. Members include companies like Wal-Mart, Metro, US Department of Defense, Intel, Unilever, Verisign, US Food & Drug Administration, US Postal Service, IBM, Microsoft, P&G, Philips, 3M, Coca-Cola, Deloitte, J&J, Abbot Labs, Tyco, Pfizer, etc.

EPC uniquely identifies a case or pallet. It uses five key pieces of information: the company code; product code; serial number that uniquely identifies the item; a header that defines different types of tags, such as those in the consumer products industry; and a filter value that allows a company to read only pallet-level tags, ignoring case-level tags or vice versa.

The International Standards Organization (ISO) has approved the EPC Gen 2 Class 1 UHF standard, publishing it as an amendment to its 18000-6 standard RFID air interface for item management using devices operating in the 860 MHz to 960 MHz ISM band.

Schematic Areas of Focus for RFID in Retail

Automated checkouts:

Checkout is a source of great frustration for consumers. The results of one survey report that 72% of respondents rated checkout efficiency as very important. Another survey calculated that average total time spent at supermarket checkout is 5.5 minutes. Of those 3 minutes, more than half of that time is spent waiting in line.

RFID technology can calculate the total cost of merchandise in the cart automatically. The payments can be effected from the credit/debit cards after requisite confirmations from the customer. Hence RFID speeds the checkout process, reduces errors at the cash register, increases customer satisfaction and reduces theft.

FIFO (First in First Out) not enforced

This leads to situations where the stocks received earlier could still remain unused leading to inefficient utilization of resources. Also many a times the products have to be discarded after the due date, leading to wastage and associated costs involved.

Increased collaboration in the supply chain

Collaborative Planning, Forecasting, and Replenishment (CPFR) activities are the main processes involved in supply chain collaboration. They drastically improved reaction time to consumer demand, precision of sales forecasts and inventory reduction.

SETU™ - RFID Adaptive Retail Solution
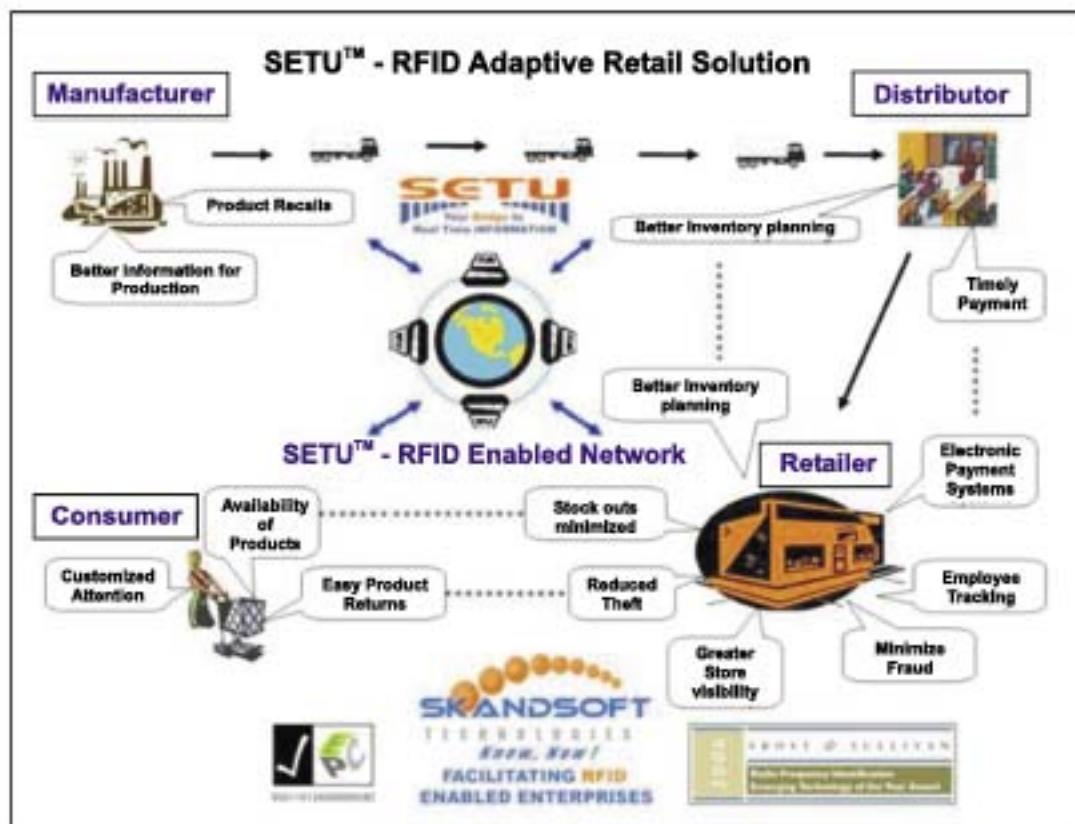
applications to improve customer service within the store. Also, Wireless workstations that enable managers on the floor to check inventory information, sales trends and labor schedules.

Physical count of items and system records not synchronized

This is possible because the goods may have been issued physically, but the system may not reflect because the updates are done at pre-determined frequency. Similarly, goods may have been physically received in the store but the system is yet to be updated.

Maintaining Shelf Stock

"How much do you lose in sales from out-of-stock products? More than you can imagine" – Diane Staley

Inventory availability remains one of the hottest issues for consumers. It is estimated that 33% of out-of-stock items are located in the store, just not in the correct location.

- Inaccurate store inventory levels are one cause of true out-of-stocks. Store ordering and replenishment systems rely on this information to generate shipments for the store.

- Receipts, sales data and cycle or physical counting are typically the only updates for store inventory systems. These all rely on manual processes and are prone to some level of error.

- Additionally, a typical product movement such as shoplifting or

employee theft will not be captured until the next cycle or physical count.

- Consumers picking up products and then putting them down in another location, where they are "lost" until a store associate locates and re-shelves the product.

- Associates not stocking or storing products in the relevant location.

- Selling through the entire display quantity before store associates can identify the trend and restock the location.

- "Losing" product in the backroom or other storage areas only to find it again later.

Mobility

Mobility means technologies that can be used to access information on the move, wireless point of sale, electronic shelf labels and client

Pricing accuracy and localized pricing:

Smart shelves with digital price tags can ensure pricing speed and accuracy. With the increase in the use of price optimization applications, RFID allows for immediate local pricing based on the results from the optimization output. This can reduce promotional re-pricing time significantly, providing retailers with enormous competitive advantage and labor savings. For example, one retail chain discovered that it could save $11 million per year by reducing the labor efforts necessary for weekly price changes at the shelf level in 4,000 stores.

Product Recalls

While product recalls may not be a common occurrence for

store operators, when they do occur they are costly and difficult to execute. Today, the only way to guarantee that all recalled product is removed from the store is to pull every item of that SKU from the shelves. This costs the store operator added expense in labor and removes some satisfactory product from the shelves, reducing potential sales opportunity.

Returns/ Warranty Authentication

A recent television commercial for a large U.S. electronics retailer satirizes a consumer attempting to return a purchased item without a receipt. As the customer is searching in his wallet for the receipt, the store associate keeps trying to tell him that the receipt is not needed since they store all the information needed in the store's computers.

Shrink/Theft

Shrinkage occurs when an item is misplaced, lost in the warehouse or stolen. Other times, picking or packing the wrong items causes shrink and creates inventory imbalances. According to the NRS survey, shrink averages 1.71% of sales in the retail industry. Return fraud is another area of store shrink that is difficult to track accurately.

Web-enabled Solution

Further, these web-enabled solutions allow the information to be configured, monitored and managed in real-time from one central location irrespective of the distribution of physical location.

Customer Loyalty Programs (CLP)

Retailers need RFID based customer loyalty programs (CLP) to

recognize the customers in real-time in order to provide customers with the personalized shopping experience they are looking for.

Retailers need to prove to the customers that their business is appreciated. The first step in this process is to personalize the service that you can provide, by identifying the individual customer. Clients like to go to stores where the staff members know their names, it makes them feel special. RFID based CLP program can be used to identify the customers as they enter the store & are greeted when they enter.

A customer may have favorite customer service representative; they can be immediately notified when their customer comes to the store. When a high net-worth customer comes to the store; the manager can be notified to personally assist them. These small things make a big difference. "A satisfied customer is a repeat customer" – Diane Staley

Customer Relationship Management (CRM) Solutions

Customer Relationship Management (CRM) programs are becoming more of a business strategy for retail chains these days. Retailers have maintained loyalty programs for years. Valuable customer purchase information has been collected, but little has been done with the data – "Ask not how much data you have, but how the real-time information can help your business".

Behavior-Based Loyalty Programs

RFID based CLP program can be used by the manufacturers and retailers to initiate programs that motivate consumers to look at new products on the shelf, by offering them higher discount coupons for things they have not previously purchased from the

store, there by opening up a potential for new business. Expand the buying profile of your current customers. "Ask not what your customer needs today, but what else you can sell them".

Match offers to customer needs in real-time

In-store advertising to a customer is very important as you have a captive audience. For CLP customers that opt to have additional interactive service, when the CLP customer enter the store the customers can be sent an SMS message on cell phones or compatible mobile devices greeting them to the store, informing of them of current specials in the store, wishing them on their Birthdays, etc. Instead of SMS, Bluetooth technology can also be used to beam much more interactive advertisement's, promotions, etc to the cell phones or compatible mobile devices of customers participating CLP customers. "Make them a Mafia offer – an offer they can't refuse" Dr. Eli Goldratt (Goldratt Consulting).

Lost Sales – The Cardinal sin of retailing – Why did the customers not buy during their visit?

Customers usually enter your store with the intent to buy. The customers may become dissatisfied, when the shopping experience doesn't meet their expectations, there could be many reasons – store personnel aren't available to help or the checkout line is too long, etc. Stores need to keep an eye for store traffic, check-out wait times, cashier service time, cart abandonment's, etc. Good service is very important. "Its not that they did not buy, but you did not do a good job of selling it to them" – Kajal Mithani.

RFID can be used to track the