

## ***RFID Demystified: Part 3 Company Case Studies.***

**By**

**Dr Richard Wilding & Tiago Delgado**

**Centre for Logistics and Supply Chain Management, Cranfield School of  
Management.**

### **Introduction**

In the previous two parts of *RFID Demystified* we have discussed the technology, possible benefits and areas of application for with Radio Frequency Identification (RFID) systems. In this final part we review Company Case-Studies of those who have decided to apply the technology within their organisation. It will be seen that considerable benefits are being experienced within some organisations, pilot applications are increasing our learning and providing a foundation for the future success of projects in this area.

### **Scottish Courage, UK - keeping an eye on 32 million container movements.**

Scottish Courage, one of the UK's largest brewers, has been using RFID technology since 1998 in order to improve their containers (beer kegs) supply chain visibility.

The management of beer kegs is a very important issue to Scottish Courage as 75 percent of sales are targeted to 'on trade' market and 80 percent of these sales involve beer kegs (Miller, 2003). The company felt that losses were

happening due to theft or damages that Scottish Courage could not prove and therefore has to cost. According to the company's RFID project director the losses due to the lack of asset location knowledge and poor supply chain visibility can sum up to £18 million per year.

Therefore they initiated a project (AVOS – Automatic Verification of Supply) costing more than £8 million where RFID technology could be used to improve their beer kegs visibility. According to Miller (2003) this project involved:

- a low cost modular system to facilitate expansion with marginal cost of additional hardware;
- the electronic tagging of 1.9 million containers with low frequency (125 KHZ – to cope with kegs' metal interference) read/write RFID tags (only the tag unique ID is not erasable);
- the equipping of 26 depots and 600 vehicles for tracking;
- custom-made hardware - draymen equipped with handheld terminal that reads both barcodes and RFID and produce deliveries' notes;
- the labelling and tracking of third party containers;
- a database to track 32 million container movements annually;
- a comprehensive suite of management information;
- the training of 2,000 employees.

The system relies on the employees' commitment to collect data in the different stages of the process. The data collection process starts with the scanning of containers during filling at brewery, and then again at the point of delivery to the customer. Empty containers are scanned as they are retrieved from the customer and then again when returned to the brewery. Additionally, containers can be scanned at the customers during audits.

The implemented system gave Scottish Courage an extraordinary level of visibility of their beer kegs. The level of information collected is substantial with

more than 30 million movements being tracked through 26 depots and 600 vehicles. This information was converted into action and Scottish Courage is already reporting benefits (Miller, 2003):

- Kegs losses halved (from 4% to 2%)
- Containers cycle time reduced by 4 days thus reducing inventory levels
- “Buying out” activities in tenanted estates reduced by 90 per cent leading to an increase in sales results (4% to 6%).
- “Unofficial supply chains” identified and curtailed
- Accurate claims on beer export duties to the UK government
- No new containers have been purchased in 3 years, representing savings of £4m yearly
- Several quality issues solved due to traceability saving money on recalls and protecting brands image
- Reduced distribution overheads due to less distribution errors

The success of this experience is going to be extended to a second phase of this project where RFID technology will be used for:

- Planned maintenance of containers
- Improved fill levels
- Improved washing regimes giving improving product quality
- Duty reclaim on ullage
- Container repair system

### **Marks & Spencer (Food Division), UK – reduced lead-time and a 15% shrinkage reduction**

Marks & Spencer (M&S) trial with RFID technology in their food division was focused on conveyances rather than on an item level. This division has annual

sales of \$4.5 billion and has invested over \$26 million in delivery and container equipment (IDTechEx Ltd, 2003a).

Because M&S food division supply chain works in a closed system with only own brand products it is easier to implement RFID tags across their product range than if they had multiple brand suppliers.

Having a supply chain with a throughput of 120 million cases a year (85 million are reusable plastic trays contained in plastic dollies) it is was necessary to have a faster and more efficient supply chain system. Barcoding was felt not to have the capability required. The limitations of their previous system and the requirement to handle more volume of throughput and faster turnaround led to a pilot with another Auto ID system like RFID. This trial was taken when it was also necessary to replace non-standardize containers for European sized containers.

The use of rewritable RFID tags allowed the tracking of the new containers along the supply chain without having to replace tags. (With the bar code system a new bar code was used at each stage). As a result there was a reduction in label costs and supply chain lead-time.

The pilot results revealed improvements in productivity with the guarantee of fresh product on shelves due to the supply chain lead-time. This is an important achievement as 70 percent of M&S food division supply chain deals with chilled fresh products that require a 24-hour supply chain from order placement to product on-shelf. Therefore M&S decided to move to full implementation of the RFID system.

The first stage of implementation involved the tagging of 3.5 million bins with RFID transponders that can be stacked and read through a doorway reader. This first stage already produced a 83 percent reduction in reading time for each tagged dolly. From the 17.4 minutes taken to read 25 trays on 36 dollies, RFID enabled to reduce it to just 3 minutes (IDTechEx Ltd, 2003a). Other benefits referred by M&S are:

- 15 per cent shrinkage reduction where RFID was employed (IDTechEx Ltd, 2003e)

- Possibility of postpone production orders to the “last minute” due to the reduction of supply chain lead time
- Improved management due to near real time tracking

### **Gillette, USA, UK – the shelf that takes your photo.**

Gillette has been one of the companies responsible for driving the development of RFID technology. Shrinkage (a mixture of loss and theft) was the main reason for Gillette’s interest in RFID technology. Trials are being conducted in a Tesco’s supermarket in Cambridge and at a Wal-Mart’s distribution centre in Massachusetts (IDTechEx, 2003b).

In the first trial, tagged packs of Gillette blades are tracked in order to prevent shrinkage as the system automatically photographs consumers as they took Gillette razors from the shelf. Customers were secretly photographed again when they left the store with the RFID-tagged products.

In the second trial, which started in January 2003, Gillette attached RFID tags to Mach 3 Turbo razor blades that are dispatched to two Wal-Mart stores equipped with ‘smart-shelves’ capable of reading the chips and tracking the goods’ location (Ewalt *et al*, 2003). When stocks on store shelves decrease, an alert is sent to refill them and an order is sent by the system for store replenishment.

Wal-Mart, however, has called off the testing of smart shelves with Gillette razors (IDTechEx Ltd, 2003g) due to changes in Wal-Mart’s business priorities that will remain concentrated on deploying RFID in its distribution centres to track pallets and cases of goods.

Additionally Gillette has recently backed away from the use of tags on an item level due to complaints that the chips would infringe shoppers’ privacy and could be used to track products even after they left stores (Waters, 2003). According to Waters (2003) Gillette did not now expect RFID tags to be used to monitor individual products in stores for at least ten years. The chips will instead be

planted in pallets and cases so that batches of products can be tracked between the factory and the store.

These last developments clearly demonstrate the difficulties that RFID tagging on an item level is still to face and enhance the focus to be made on the use of RFID tagging on a case and pallet level to improve supply chain visibility.

### **The Gap, USA – 100% on-shelf availability increasing sales by 12%**

A three-month trial was carried out in a Gap store in Atlanta where Texas Instruments RFID tags operating at 13.56 MHz were used for item level tracking of denim apparel. The aim was to reduce stockout situations and obsolete inventory, enabling staff to locate specific articles. It also aims to improve supply chain efficiency by having an increased stock visibility from factory to store.

The result was an almost 100 percent on-shelf availability of the RFID-tagged merchandise and a 12 percent increase of sales of this merchandise in comparison to “control” stores that were not using an RFID system (IDTechEx, 2003c). The system also allowed easier store replenishment for employees and a more efficient inventory management system to be created.

The trial achieved positive results from improving handling efficiency with a return on investment of 1.7 years (Das, 2003), half the time that was originally estimated. Despite the advantage of working in a closed system where production is controlled by “The Gap”, a roll-out of RFID system in their chain of stores is still not part of their plans because of funding requirements (Harrop et al, 2003) and the lack of standards and a suitable open system (IDTechEx, 2003d).

### **Tesco, UK – the intelligent shelf.**

Tesco is currently trialing tags on DVDs at its Sandhurst and Leicester stores. In this trial Tesco is testing smart shelves technology in collaboration with

MeadWestvaco, an American packaging company and Entertainment UK (EUK), that keeps DVDs stocked in 2,500 retail stores in the UK (Thomas, 2003).

It uses RFID tagged DVD's that are programmed using MeadWestvaco Intelligent System (MWVIS). For the trial, MeadWestvaco retrofitted ten four-foot by six-foot shelving units with 13.56 MHz readers. Two readers provide power to hundreds of antennas using the MWVIS networking technology. The backroom of the Tesco store was also equipped with this technology that is designed to work with the Electronic Product Code technology developed by the Auto-ID Center (IDTechEx Ltd, 2003e).

The trial will allow staff at Tesco and Entertainment UK to see, in near-real time, exactly what is in the store (shelves and backroom) through a secure Web site and allows staff to see when goods are out of place or need to be restocked. The system records when a product was moved. Additionally it will allow staff to save time spent in sorting DVD titles and to improve on-shelf availability as the titles will be stored in the correct place and the system can give a warning if items are in an incorrect location.

In addition a trial is being made with Gillette's razor blades, Tesco initiated a trial in September 2003 in a non-food depot in Milton Keynes (UK) where selected cases of non-food items moving between the depot and its stores in Peterborough and St Neots in Cambridgeshire in the UK were RFID-tagged. From this trial, Tesco is already planning to roll-out RFID tagging technology across its supply chain in 2004 with its Secure Supply Chain Initiative (IDTechEx Ltd, 2003f). This roll-out will start with the tagged cases being moving between distribution centres and stores on selected products. It is hoped that from Autumn 2004 that Tesco will introduce its suppliers to the technology with cases tagged from source. By 2006, all suppliers will have to supply Tesco distribution centres with cases and pallets carrying RFID tags.

Tesco also plans to start tagging more individual products in 2004 with RFID technology

## **Woolworths, UK – total transparency for item-tote-dolly-container-driver-route-store**

Woolworths involvement on RFID technology came under the Home Office's 'Chipping of Goods' initiative (Frontline Solutions, 2002a). For this retailer, the losses due to shrinkage, which had an impact on service and inventory levels, were considerable enough to justify a trial with RFID technology.

In 1999, a small-scale pilot was launched and involved one distribution centre and one store. The Woolworths' trial revealed that RFID has potential applications to improve supply chain transparency and to reduce supply chain costs. But, at that time, it was felt that the technology was too expensive, not robust enough and without any universal standards. Moreover there was a lack of a compelling business case to justify further investments in such a new technology.

In 2002, and within the Home Office's initiative, Woolworths started another trial using RFID technology in one distribution centre, two stores with fixed RFID infrastructures, and 30 stores by using mobile RFID infrastructures. In this trial the RFID tags were placed on 16,000 dollies instead on each product item because the average item value of £3 could not support the investment of individual tags (O'Neill, 2003).

The systems uses an integrated approach using various technologies. Products are picked into tote boxes with a unique barcode identification that will be assigned to a dolly identified with a unique RFID tag, this dolly can carry up to ten totes. RFID readers distributed in strategic places within the distribution centre track the dollies' movement in real time and ensure that they are loaded into the correct vehicle ready for despatch. This also allows identification of mistakes before the product goes any further than the dispatch bay. When dispatched, a GPS system tracks vehicles that are associated with the dollies that they carry. Therefore, it is possible to track products through the logistic chain from the vehicle level to the item level - item-tote-dolly-container-driver-route-store. At the store, drivers using handheld RFID/barcode scanners confirm the delivery without

the need of paperwork related to proof-of-delivery. Finally, the stores involved in this trial were equipped with fixed position readers that gather and check information on the dollies' contents at arrival from the distribution centre.

This original six-month trial that was extended and 2,500 deliveries were tracked and the movements of 350,000 tote boxes filled with goods were recorded (Frontline Solutions, 2002a). The results confirmed improvements on the processes by using information that identifies the causes of supply chain inefficiencies. This situation led to the reduction of costs associated with:

- shrinkage reduction (this was 1.8 per cent of sales)
- reduced labour for deliveries' checking and claims processing
- improved utilisation of totes and dollies
- the reduction of inventory levels, improving product availability and customer service

### **Selfridges and Exel, UK – security and product tracking**

Selfridges is conducting a trial with RFID tags to follow the movements of food stock by tracking the inbound and outbound movements of 20 vehicles and 120 temperature-controlled food containers (Daw, 2003) from its Hams Hall national distribution centre to its Manchester, London and Birmingham stores (Excel, 2003).

This trial is being conducted together with third party logistics company, Exel, to which Selfridges has outsourced its supply chain management.

Active tags with reading ranges of up to 2 meters are being used in this trial due to their reusability capability, and consequently, longer term costs (RFIDJournal, 2003c). This allows readers built in each loading/delivery bay door to detect the pallets inside vehicles or containers and automatically update Selfridges' stock management systems as they leave or enter the compounds. This accuracy is increased by the use of interactive touch screen monitors that help staff to cross check the stock levels and to confirm the stock movements by flashing when a correct reading has been taken and emitting an alarm when a problem arises.

The RFID trial aims, in the short term, to integrate Selfridge's warehouse management system in order to explore other opportunities offered by RFID, including product tracking to and from the stores, increased security and delivery processes improvements within Selfridges' stores.

### **Allied Domecq, UK – tracking ownership and duty paid status**

Allied Domecq is a major producer of wine and spirits. Trials were undertaken with RFID within manufacturing and supply chain environments that successfully demonstrated the benefits that could be accomplished in a closed system.

More recently, and under the "Chipping of Goods" initiative (Home Office, 2003), another trial was launched. In this trial, individual bottles of spirits were labelled with a unique serial number encrypted in a two dimensional bar code. These bottles were packed into cases and their information associated with the unique case serial number. Then, the numbers for every case were associated with the RFID tag of the pallet, on which the goods were transported, enabling the movement of product to be tracked through the supply chain from one distillery to two distribution centres.

The aim of this trial is to provide evidence of ownership and duty-paid status and to trace the products across the supply chain (IDTechEx Ltd., 2002). However there are no reports regarding the success and results of this trial.

### **Argos, UK – from 54% to 100% data capture**

Argos involvement in the 'Chipping of Goods' Initiative is mainly due to the fact that they are a retailer of high value products such as jewellery, electrical and furniture. Because jewellery pieces are small, making them very conveyable, this was the chosen product to track for this nine-month trial, which aimed to reduce the shrinkage. Upto 16 per cent of the products are returned so an improvement in supply chain transparency was also sought (IDTechEx Ltd, 2003e).

The trial involved twelve stores and three distribution centres. The RFID tags were used on roll-cages and totes, active tags on roll-cages and passive tags totes. The product is put into the totes that are placed on the roll-cages and sealed. The tags movements are then tracked as they are loaded and unloaded throughout the supply chain.

The result is the ability to trace products and identifying supply chain vulnerabilities. This immediately resulted in the solving of throughput claims made by distributors.

Recent results revealed higher levels of reliability showing 100 percent data capture against the 53 percent that had been achieved with manual data capture (IDTechEx Ltd, 2003e). However a decision regarding the rollout of the system will be considered after a final review of the trial.

### **Figleaves.com, UK – picking errors down to 0.1%**

Figleaves, a UK-based Web site that sells intimate apparel, uses RFID technology provided by Texas Instruments to rationalize the picking and shipping of their products without having to expand their facilities.

Items are stored in carts that carry three tote boxes, each of them have up to eight compartments and feature a unique RFID tag (RFIDJournal, 2003a). The carts are equipped with radio data terminals that tell the warehouse staff where to go to find the right tote. The system allows the pickers to assemble up to 24 orders into a single cart by selecting the best picking sequences in order to optimise walking distances in a single trip with total accuracy. These picking carts have a built-in radio terminal with a graphics display with picking instructions thus preventing staff from mixing up the orders to be sent out and saving the time and labour spent on double-checking orders before they are shipped.

When picking operations are finished, the tote boxes are delivered to a packing bench fitted with RFID readers that identify each tote and associate it with the order. When the order is complete the system prints a delivery note and a label and finally the order is sent to the mail sort.

The result is a system that enables staff to pick 60,000 items per month with an error rate of less than 0.1 percent. This has led the company to expand the use of RFID technology.

### **Benetton, Italy – Gaining transparency**

In March 2003, Benetton announced the use of RFID technology to track garments from the point of manufacture to the retail store (Albright, 2003). The project entails the order of 15 million tags, initially for carton tracking but with the intention to implement tagging at an item level. This decision is to be reviewed because Benetton is waiting for a cost/benefit analysis and for the potential privacy issues associated with the potential to monitor customer behaviour (Krane, 2003).

Benetton's distribution centre in Italy, which has a capacity of 400,000 boxes and handles 20,000 incoming and 20,000 outgoing boxes per day (Albright, 2003), will be equipped with RFID infrastructures. Franchised stores will follow this implementation at their discretion with an initial investment in RFID handheld equipment. The advantage of Benetton's implementation is the fact that it works in a closed-loop supply chain where there is total control and vertical integration. This avoids any interaction with different systems used by external suppliers.

Benetton's aim is to improve supply chain transparency. This is expected to increase product availability and consequently sales, and to reduce losses associated with shrinkage and counterfeiting.

### **Wal-Mart – Auto-ID Center, USA – costs down and inventory accuracy up.**

Wal-Mart, together with the Auto-ID Center is conducting a field research with the collaboration of key suppliers.

The first stage of this research was concerned in source-tagging pallets of paper towels in a P&G factory to be sent to a Sam's Club in Tulsa, Oklahoma. It was possible to have real time visibility of inventory from the factory to the retailer's store.

Companies like Unilever, P&G, Kraft, Coca-Cola, Gillette, and Johnson & Johnson will ship tagged cases to and from selected distribution centres and retail stores in over 8 US states. This enabled the supply chain to be fully automated as products passed through without manual checking. Even though there was a considerable increase in the quantity of data produced by moving from the pallet level to the case level, the system continued to work well.

Wal-Mart has reported a 5 to 6 percent drop of supply-chain costs (Logistics Manager, 2003), 20 percent cut in labour costs and accesses to 30 times more data from its pilot distribution centre in Oklahoma, managed in partnership with suppliers (Harrop *et al*, 2003). It is important to notice that these results are being achieved with tagged products costing in average USD\$1.75 (Frontline Solutions, 2003), which demonstrates that case level tagging can already provide returns of investment when using tags costing 30 cents. Additionally it was noticed that an increase in inventory accuracy from 95 to 99 percent (Overby, 2002).

Recently Wal-Mart was planning to run a third phase of this research to test the system's capability with tagging individual units. Conversely it was decided to call off those trials (IDTechEx Ltd, 2003g) and to concentrate priorities on deploying RFID in its distribution centres to track pallets and cases of products.

Finally, in June 2003 Wal-Mart informed its suppliers that it will call for RFID tagged pallets and cases by January 2005 (RFIDJournal, 2003b). However this decision will result in hard negotiations with some suppliers reluctant to absorb the costs of RFID implementation that will also benefit Wal-Mart. It is however argued that this decision will bring the RFID issue onto the agenda of FMCG companies and lead to a faster adoption of the technology and the development of a common standard.

## ***RFID Applications – Customer Experience Focus***

### **MyGROCER Project – A cupboard and fridge that automatically orders your food and a SAT-NAV system for your supermarket trolley!**

The MyGROCER project was launched by the European Commission and is backed by the Athens University and Helsinki University of Technology and by various players from the FMCG industry, both manufacturers and retailers. Its aim is to evaluate auto-ID technologies that increase the efficiency of supermarkets and other retailers in the replenishment procedures. It also aims to consider what value-added grocery shopping options might be available to a shopper in an auto-ID enabled supermarket. The system provides a technological infrastructure in-store and at home in order to support the shopping process.

The trials took place in two specially enabled stores, one in Greece and one in Finland. Products were individually tagged and readers were placed in strategic points throughout the stores in order to constantly track products in store and in the customers' trolley.

Additionally, the trolleys were attached with a touch screen terminal and an RFID/barcode scanner that enabled an enhanced shopping experience to the customers:

- Customers' behaviours could be registered by using a loyalty card, giving the chance to remind them about the products that they may be interested and informing products availability
- Added information about a product or promotions was provided to customers according to their choice or personal profile
- The terminal assists in in-store navigation by displaying a map that helps shoppers to find their way more rapidly to items they want to buy (A form of supermarket SAT-NAV!).

- As the shopper scans items into their cart, additional information about the products appeared on the screen and that item is crossed off the shopping list
- Checkout can be made automatically without queues and stores inventories can be updated in real-time. Additionally, the information of the customers shopping list is maintained in the system and the point of sales data can be used for future promotional activities.

From the 60 participants of the trial in Greece, 88 per cent experienced a faster shopping experience and 97 per cent found that the new system made their shopping easier. The respondents also appreciated the automated checkout and continuous monitoring of the total value of the cart's contents. In the Finnish store there were 30 participants joined the trial, this presented similar results to the Greek store. In parallel to the in-store experience, two other scenarios are considered in the MyGROCER consortium: home and on-the move (Kourouthanassis *et al*, 2002).

The home scenario prerequisites a 'home server' and RFID readers, placed in key-storage locations in the customer's house. When tagged products are removed from their location and not restored within a specific period of time a replenishment order is sent to the MyGROCER service provider via an internet connection.

In the on-the move scenario the consumers can manage their shopping list and conduct mobile shopping transactions through a mobile phone. The consumers might choose between having home delivery or submitting their shopping list to a set of registered supermarkets in a MyGROCER initiating reverse auction. Other value-added services comprise the notification of stockout products and access to information tailored to the consumers' profile.

### **METRO Group Future Store, Germany: an advanced loyalty card**

A recent initiative in the RFID area was launched in April 2003 on an Extra store in Rheinberg, Germany, which belongs to the METRO Group, a German retailing company (Yoshida, 2003). The objective of the initiative is the development of

solutions that lead to advantages for the consumer and FMCG industry, resulting in an enhanced shopping experience for the consumer. METRO Group associated with Intel (the microprocessors producer), SAP (business software solutions provider) and another 40 companies from the IT, services and consumer goods industries to collaborate within the scope of the initiative.

Unlike the other initiatives that are being undertaken in retailing, this one links many diverse innovative technologies and applications including RFID due to its capability for tracking and identifying goods across the logistic chain. As a result, it is expected that the resulting processes can bring costs down and additionally that customer's loyalty and satisfaction can be improved due to product availability and tailored services.

At the Extra store, RFID is used mainly used within warehouse management but also for shrinkage reduction and customer experience enhancement. Three FMCG companies provide products using RFID tags – Gillette, P&G, and Kraft – which are using them for different reasons (METRO, 2003):

- Gillette - To reduce/avoid shrinkage, and potentially to control inventory as in the experience being conducted at a Tesco store in Cambridge, UK: The smart shelf readers allow the detection of shrinkage, product misplacement and updated inventory control.
- P&G - Currently to achieve more direct communication with the consumer: When a Pantene shampoo bottle with tag is lifted from the shelf, the display screen above the shelf is activated and starts an advertisement tailored to that product
- Kraft - Inventory control based on shelf-life: The tagged goods are issued at the warehouse in pallets and boxes and are tracked from arrival at the store and back-store area through placement at the smart shelves located in the sales area until checkout, where the tags will be disabled.

### **Exxon SpeedPass, USA – a wrist watch that purchases fuel and burgers!**

Exxon introduced the Speedpass payment system in 1997 at Mobil service stations. This system operates like a credit card or debit card where customers point an RFID transponder at a countertop reader and the transaction is billed to a pre-arranged credit or debit card account of the customer's choosing.

Exxon Mobil (Associated Press, 2002) said there are more than 5.5 million Speedpass customers who use the Speedpass system in more than 7,300 Exxon and Mobil stations nationwide.

More recently Exxon and Timex conducted a trial with 300 Chicago-area residents (MacLean's, 2002), each was given a SpeedPass wrist watch. In this trial, clients that want to fill their vehicle with petrol in an Exxon Mobil service station, or buy a meal at a McDonald's restaurants, just have to point their Timex watch at an electronic reader at the pump or drive-thru and the transaction process is automatically done. Additionally this system is being tested at Ahold USA Inc.'s Stop & Shop supermarkets (Associated Press, 2002), which operate more than 300 stores in the Northeast of the USA. This will let retailers operate their own loyalty-card program within the Speedpass system and allow customers to instantly pay for purchases and get Stop & Shop rewards and discounts without also having to swipe a loyalty card.

The system reduced the average fuel purchase time from 3.5 minutes to 30 seconds and the companies involved with the SpeedPass program are reporting 20 percent increases on sales per store (Overby, 2002) and also an increase in customer satisfaction (NACS - National Association of Convenience Stores, 2002).

### **Prada, USA – the space age dressing room**

Prada, fashion retailer opened in December 2001 a conceptual store in New York City (IDEO.com, 2003). The store aims to enhance the customer's shopping experience into its maximum level by using RFID technology.

Each merchandise has its own RFID tag that when scanned and detected by readers provides immediate access to a database which keeps a wide-range of information about products in the form of sketches, videos and colour swatches.

The customer is also provided with a contactless smart card containing information regarding customer's preferences in order to customize and enhance the service provided.

Additionally, the customer and sales person (that have access to wireless devices distributed around the store) will be aware of sizes and colours available of any product in-store (RFIDJournal, 2002).

The store's dressing rooms are equipped, with a glass-door that switches from transparent to translucent at a touch of a button and a touch screen that provides customer access to the Prada database. As garments are hung in the dressing room their tags are automatically scanned and detected by a reader implanted in the dressing room. Then the information of that product is displayed on the screen allowing the customer to select other alternatives of size and colours, or matching accessories among other choices.

## ***Conclusion***

RFID projects have been found to be highly successful when applied to internal operations or for tracking goods between one or two trading partners. This occurs because RFID projects applied to larger supply chain networks call for the bringing together inter-company processes, data models and technological investments.

Cost is still seen as a barrier to item level deployment of the technology except on high value products in vertically integrated supply chains. The successful application of RFID tags in the retail industry at an item level is currently limited to specific 'closed loop' high value applications .

However, early return on investment is possible if investments are made in distribution and inventory management activities on a pallet level. In this way, it is possible to avoid stock-outs, monitor transport and distribution centres, secure correct shipments and accelerate logistics operations.

Public concern related with privacy issues will be also a barrier to item level deployment of RFID and is already causing changes in intended strategies (e.g. Benetton and Gillette).

Table 1 resumes the return of investment time frame of different levels of RFID technology deployment within the cases discussed in this chapter and that provided a clear picture of the expected developments in RFID applications discussed in chapter four. From the analysed cases it is clear that there is a focus on asset management applications as well as on those that improve on-shelf availability and reduce shrinkage levels.

RFID is being used for the enhancement of the customer shopping experience, the trials that are being conducted are aimed at the improvement of the interaction with customers according to the market segment preferences. Therefore, some RFID trials are offering services that present the shopping activity as an entertainment experience and others offer services that facilitate the speeding up of the shopping experience. The shopping experience desired by the customer will ultimately drive the retailers to tailor the shopping experience to the customers' needs.

### The Return of Investment of RFID Technology

Goal	ROI Time Frame			Benefit	Benchmarked Companies
	Near	Medium	Long		
Accelerate Logistics Operations	☺			<b>Pallet and case level:</b> efficient loading and unloading	Figleaves
	☺			<b>Pallet and case level:</b> proactive notification of errors that delay shipments	M&S
		☺		<b>Case level:</b> faster picking and packing, easier cross-docking and management of mixed pallets	Woolworth's Selfridges
Quality Control	☺			<b>Pallet and case level:</b> custody change auditing and environmental monitoring of perishable goods	M&S
			☺	<b>Item level:</b> increased success rate of product recalls using RFID data combined with purchase history data	Scottish Courage
Asset management	☺			<b>Pallet, case level and more:</b> better asset management of RTE assets, as well as heavy machinery like forklifts and tractor trailers	Wal-Mart
					Scottish Courage
					M&S
					Selfridges
					Woolworth's
					Unilever/Safeway
Decrease Stockouts		☺		<b>Case level:</b> better demand visibility because stores alert DCs when back storerooms run low on cases of products	Woolworth's
					Unilever/Safeway
					Gillette
		☺		<b>Item level:</b> better demand visibility because intelligent shelves in the front of the store indicate when they need restocking	The Gap
					Tesco
					Benetton
Reduce Shrinkage		☺		<b>Case level:</b> shrinkage reduction throughout the supply chain	Woolworth's
					Unilever/Safeway
					Allied Domeqc
			☺	<b>Item level:</b> consumer theft reduction and anti-counterfeiting enforcement	Argos
					Scottish Courage
					M&S
Increase promotions effectiveness			☺	<b>Item level:</b> pay-per-performance trade promotion contracts based on shelf inventory and merchandising effectiveness	MyGrocer METRO Prada

Table 1: The Return of Investment of RFID technology (adapted from Overby, 2002)

## ***Further Reading & Bibliography***

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