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# RFID

## TAKING IT TO THE RETAIL FLOOR

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# RFID TAKING IT TO THE RETAIL FLOOR

**Apparel's** 2nd Annual RFID Report offers an exciting look at the possibilities of RFID as it moves through the supply chain and into the retail store.

*By Christophe de la Bourdonnaye and Philippe Fabre  
Capgemini*

**R**adio-frequency identification (RFID) has proven itself capable of delivering huge benefits to the apparel market. Still, for many retailers, whether or not to implement the technology remains the \$64 million question. As those companies continue to debate the merits of the technology, others are assiduously moving forward, implementing RFID in their supply chains, and at the item level in their retail stores.

In this second annual RFID special report, *Apparel Magazine* and Capgemini have teamed up to present a compelling look at the advances in RFID and efforts being made to standardize the technology. This report also offers concrete examples of what RFID can deliver to your bottom line, and a glimpse at some of the exciting possibilities into which apparel companies are only just starting to tap.

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Speaking generally, the fashion and apparel sector has optimized its supply chain operations: manufacturing has been outsourced, distribution centers have been automated and transportation optimized.

Yet this almost-perfect tracking system comes to a halt when product enters the retailer's back room, creating a "black hole" effect, whereby the flow of information is virtually one way, with only sales information making its way back out of the store. Other data, such as product that is misplaced or missing, is only available within the store and as the result of individual employee efforts, and even this remains undocumented. Additionally, data about the movement of goods throughout the store is not at all visible to the company.

RFID provides a key to reversing the black hole, and a way for retailers to benefit from the enormous amount of information that today is still largely unknown. Casting the RFID wand over the apparel world produces almost magical results.

## **The 'store of the future' can be yours today**

To illustrate this, imagine this scenario from the store of the future:

You are a store manager for an international fashion brand. Each morning, you receive the shipments that you ordered two days previously. Within minutes, and without opening the cartons, a salesperson is able to count items and cartons, and provide immediate feedback relative to order accuracy. Your system also will notify you if some products on the floor are in short supply so that you can prioritize the stocking of store shelves.

At closing time, an employee takes a complete inventory of 5,000 items, in less than 15 minutes, and has learned to do this after a very short and simple training session. During the count, the employee will be alerted to items that are misplaced, and also will generate a list of items that the system determines have most likely been stolen.

This is a key advantage of RFID. Without this latter alert, every item stolen from the store will cause you to be short inventory, and thus will result in lost sales. Items that aren't registered as sold will not trigger replenishment, thus also contributing to overstock in the DC. This will lead to sales and price reductions further down the line, and reduced net margins.

In the store of the future, fitting rooms also are equipped with RFID readers and antennas, alerting employees to items left in the fitting room.

Perhaps most importantly, RFID can provide statistics on the movement of items throughout the store, showing, for example, how many and which items were handled by customers and the number of those that sold. This allows the retailer to calculate the ratio of handled-to-sold merchandise, which provides crucial information for developing strategic merchandising plans.

### Shop-level operations through the eye of the customer

It's not just the retailer that will notice major improvements from RFID. The customer will have a favorable experience as well. How so? To begin with, the consumer will receive:

- ▶ **Faster product location.** Through the use of smart shelves, sales staff will be able to rapidly answer customers' questions about where to find a particular SKU.
- ▶ **Improved access to detailed product information.** RFID-enabled terminals located on the retail floor can provide supplementary product information triggered by RFID tags.
- ▶ **Improved access to product availability.** For the apparel customer in particular, RFID provides more, better and faster information on the availability of sizes and colors.

For example, consider the case of a customer, shirt in hand and seeking a different size. A salesperson will be able to help the customer instantly by reading the RFID tag with a PDA to check the stock situation, which could lead to any of various outcomes.

The salesperson might find that there is one in the backroom and one in the fitting room, perhaps, or that the garment is out of stock but arriving the next day, or that the garment is available in another store, and may offer to deliver that to the customer's home, etc. Whatever the case, answers are instantaneous, and the customer walks away with a shirt, or a solution, in hand.

- ▶ **Shorter waiting time at point of sale (POS).** RFID also helps reduce waiting time at the point of sale, which can be a huge benefit for the customer but also for the retailer in peak selling periods. How does it do this? RFID allows for "bulk reading," instead of individual scanning of products. Also, the time-consuming process of removing EAS anti-theft tags is no longer necessary. RFID functions in this regard, changing the status of the garment in the database as the tag is read.
- ▶ **Efficient after-sales processes.** With regard to after-sales activity such as returns, complaints and warranty issues, and provided that integrated tags are used, RFID will enable these processes to be handled more rapidly and without the use of paper receipts, as RFID will be used as a lifelong proof of sales.

There remains some resistance from consumer organizations to the adoption of integrated tags, which continue to raise red flags over privacy concerns, an issue that must be taken into account from the start of any RFID project.

We usually recommend that our clients be as transparent as possible about their purpose in using RFID tags to track items in the fashion and apparel distribution network.

Additionally, we recommend that companies notify consumers of the use of RFID on the label, if that use extends to tracking products on the retail floor.

**FAST FACT**  
One of our clients in Italy uses RFID tags to identify the origin of its products, which are sometimes found in the wrong distribution circuit. Inspectors use PDAs and control the UID (unique identification) of the tag to identify origin.

- ▶ **Guarantees of authenticity.** RFID tags can ensure the consumer that he or she is receiving an authentic, and not a counterfeit, product. This quells the concerns of the consumer, but functions as an important protection for the retailer as well.

Should we conclude that RFID is magic? At first blush, the answer is yes. But implementing RFID cannot be done with a magic wand. As with any major change, it is an absolute necessity to switch to a project mode within the whole company and to define an action plan.

**FAST FACT**  
One of Caggemini's clients is currently researching RFID "smart shelves" for use in its bookstores.

**FAST FACT**  
One of our consumer research studies revealed that 60 percent of customers report being ready to buy RFID-tagged items for faster checkout.

Based on our experience, we have found that an RFID implementation must be supported by the company's top management. As such, it is crucial that the project is led in a pragmatic fashion, and as part of the process, that a return-on-investment assessment is performed before the project begins.

**Performing an ROI assessment**

It is generally agreed that the primary benefits of RFID are:

- An increase in the procurement of “best sellers.”
- An increase in full-price seasonal item sales.
- A decrease in shrinkage (including “sweethearting”).
- A decrease in overstocks.

Figure 1 illustrates a typical ROI scenario.



**FIGURE 1 - Typical ROI Scenario for Apparel Retail RFID**

NUMBER OF STORES	300	
Number of units sold	17 million	Assuming use of RFID on one-third of stock
Revenue	€510 million (US\$704 million)	Average unit price: 30€; VAT included
Operating margin before RFID	€26.5 million (US\$36.6 million)	Assuming 6.5 percent average margin
Operating margin after RFID	€29.2 million (US\$40.3 million)	+ 10 percent; RFID costs excluded
Margin increase	€2.7 million (US\$3.7 million)	RFID costs excluded

However, the benefits of RFID for fashion and apparel depend heavily on the type of distribution model (i.e. hypermarkets, specialty brands, department stores, luxury).

Figure 2 details the benefits of RFID per type of store.

**FIGURE 2 - RFID Benefits by Store Type**

The greater the number of dots, the greater the benefit in each category. Figure at bottom reflects the total number of dots in a column, with higher numbers reflecting greater overall benefit.

	SPECIALTY	LUXURY	DEPARTMENT STORE	HYPERMARKET
Automated receiving in the DC	••	•••	••	•
Control of pick-and-pack operations and shipments	•	••	•	•
Faster control of warehouse operations	X	•••	•	X
Automated controls upon arrival in the shop's backroom	••	•••	•••	•
Inventory costs	••	•	•••	••
Immediate view of shrinkage and automated proposals for replenishment orders	••	X	••	•
Automatic alert on short inventory on shelves (while item is in the backroom)	••	X	•••	••
Item localization and putaway	••	•	•••	•
Frequent measurement on theft per store	••	•	••	•
Efficient information to customers	••	•	•••	X
More time spent on sales	••	•	••	•
Right information on merchandising	•••	•••	•••	•
<b>Total</b>	<b>22</b>	<b>19</b>	<b>28</b>	<b>12</b>

X= not applicable

### **STATUS UPDATE: RFID**

Despite numerous publications, discussions and forums taking place about radio-frequency identification (RFID) in recent years, suppliers and systems integrators generally admit that the adoption of the technology has been slower than expected when compared to its promises.

Perhaps too much was expected too soon. Yet the technology is becoming more mature, and real-world pilots and projects provide renewed credibility for RFID. For example, Marks & Spencer, which started its RFID project four years ago, this year is successfully tracking tens of millions of items with RFID labels.

At the same time, standards for interoperable RFID usage have been developed and regulations have been upgraded to support interoperability and maximum performance in different regions of the world. EPCglobal and ISO are working together to provide coherent standards for the tags and the reader interfaces, but also for the exchange of RFID-related data between trading partners. And other standards development work continues that will improve communication and collaboration of RFID information. (See "RFID Standards and Regulations Evolution," p. 7.)

All of these developments show that RFID capabilities have improved immensely since 2003, when RFID started to generate buzz in the apparel industry. And what about developments in terms of real-world business applications?

To date, most RFID applications have been developed for parcel tracking within distribution centers, with the advantages of the technology most apparent in its ability to automatically identify and track parcels within the supply chain. This benefit has long been touted by RFID suppliers and integrators. As the technology has evolved to allow better performance and quality, RFID has allowed apparel companies to reduce human error, eliminate low value-added tasks such as counting, and so forth.

Today, however, given the major evolutions and advances in the technology, the real opportunity with RFID lies with item-level tagging processes. This will allow apparel companies to carry the benefits of automated tracking through the supply chain all the way to the cash register, enabling two-way communication along the supply chain and eliminating the retail store's "black hole."

### **CASE STUDY: RFID Reduces Lead Time**

RFID successes are not just theoretical. There are many examples of apparel companies currently involved in RFID projects that are reaping the benefits of the technology.

Following is a summary of an RFID project that we recently undertook with a major French luxury fashion brand retailer:

#### **REQUIREMENTS**

- To improve the operations of the entire supply chain while increasing reliability and speed in the DC and boutiques.
- To improve the reliability of the entire supply chain to ensure that the right items are in the boutiques on time for the launch of a new collection. (This luxury retailer turns six to seven collections annually.)
- To improve the traceability of the items (returns to suppliers, etc.).

#### **SOLUTION**

- After a project scope evaluation, we recommended the use of RFID technology to identify and track each item shipped to and received in the DC in a first phase, and in the boutiques in a second phase, with tags removed at POS.
- The operations selected for tracking were: reception and control of the items, stock receiving, returns to suppliers and shipments and reception in the boutique's back room. A new operation called "tags initializing" was introduced.
- A pilot was performed to validate the benefits hypothesis.

#### **RESULTS**

- The global lead time to supply the boutiques has been reduced by more than 15 percent, thus ensuring the right items are received on time.
- 100 percent of tagged items are immediately checked; routing mistakes can be identified and managed immediately.
- Additional boutique locations are gradually being equipped with RFID, and increasing numbers of items receive RFID-tagged labels.
- The other benefits in the boutiques (stock inventory) will be measured in a second phase of the project.

Figure 3 shows the relative level of complexity in implementing the RFID solution per the type of store.

**FIGURE 3 - RFID Implementation: Level of Complexity**

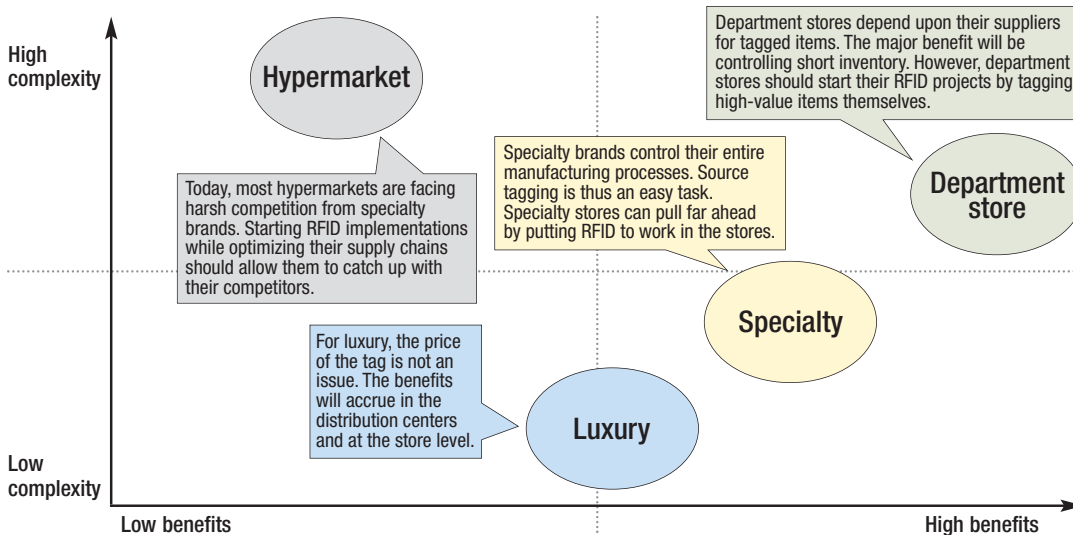
The greater the number of plus symbols, the greater the complexity in each category. Figure at bottom reflects the total number of plusses in a column, with higher numbers reflecting greater overall complexity.

	Specialty	Luxury	Department store	Hypermarket
Cost of tag vs. cost of item	••	X	••	•••
The company owns its brand and controls the manufacturing (i.e., owner of the tags)	X	X	•••	•••
Number of stores	••	•	••	••
<b>Total</b>	<b>4</b>	<b>1</b>	<b>7</b>	<b>8</b>

X= not applicable

Figure 4 provides additional perspective by combining Figures 1 through 3 in an accessibility matrix.

**FIGURE 4 - RFID Benefits and Complexity, by Store Type**



Of course, other factors must be taken into account when considering an RFID project. An ROI calculation necessarily includes the annual cost of tags, which can be a major obstacle to a wider adoption of RFID in the sector.

A theoretical gain of 2.7 million euros (US\$3.7 million) in margin as in Figure 1, for example, would require a company to spend 1.1 million euros (US\$1.5 million) on tags annually (based on a cost of roughly 0.20 euros (28 cents) per tag on one-third of stock) — a large expenditure to request of most finance departments, but one that can pay off in spades, with proper evaluation and planning.

An example of a major apparel retailer that took the plunge despite the costs, Marks & Spencer approached its RFID implementation project with a goal of identifying the full benefits of the technology and proving the ROI on a global basis, to include benefits from the DC to the retail floor and indirect revenues from providing better service to the customer. We believe that the decision to implement RFID will be made only by companies that have fully optimized their supply chain performance and customer service using tools already available to them.

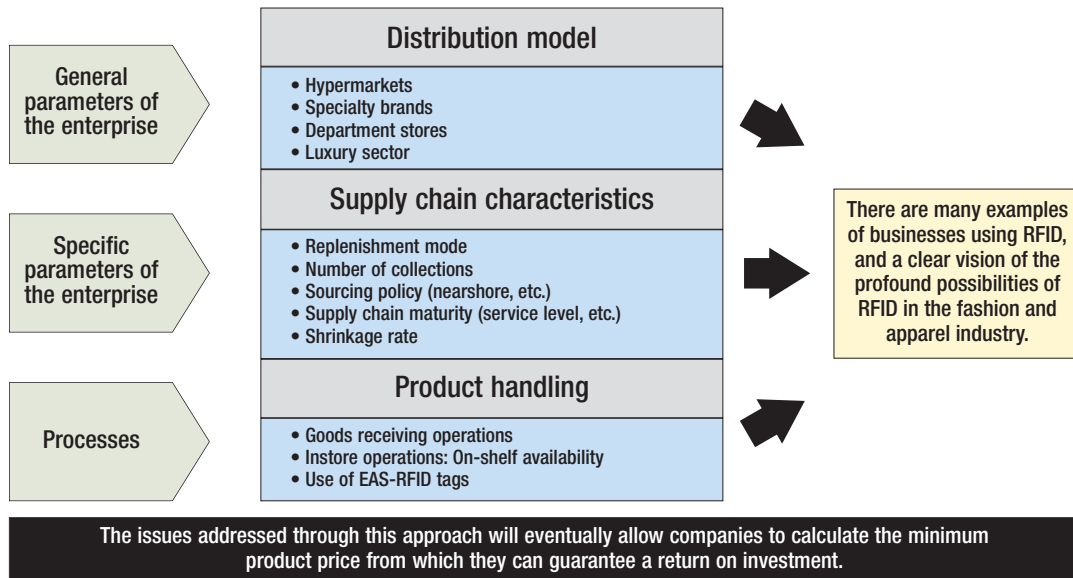
**FAST FACT**  
 Our experience indicates that customers will accept an increase in price of about 0.20 euros (28 cents) per item provided the advantages of RFID prove to be truly beneficial to them and meet their expectations.

**A pragmatic approach to measuring ROI**

The benefits of RFID will depend in part on the type of market your business represents, the general structure of your supply chain and organization as a whole and the specific flow of your processes.

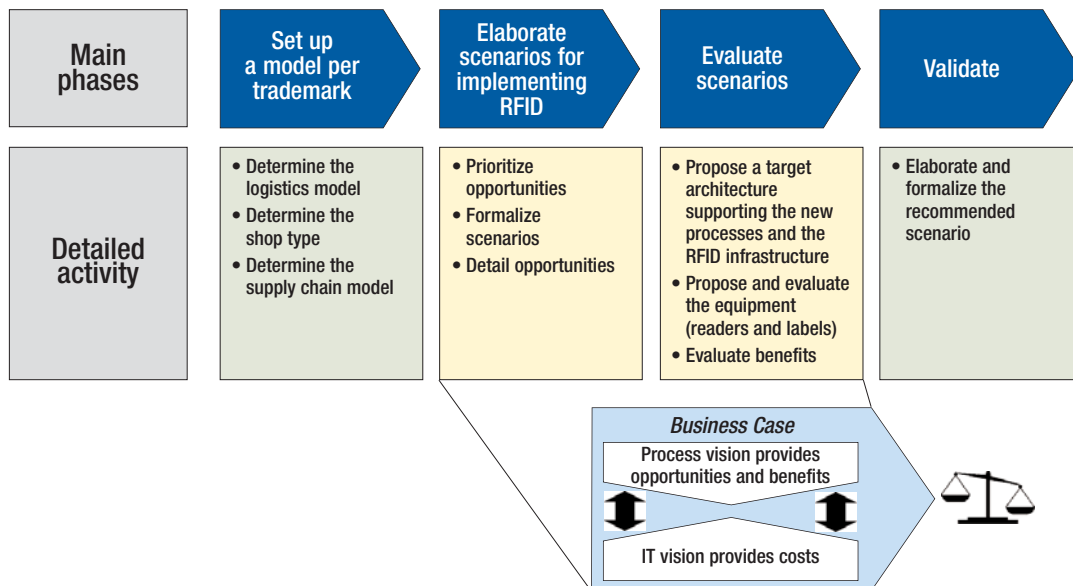
Figure 5 provides an outline of points to consider when determining the potential ROI of an RFID program in the fashion and apparel sector.

**FIGURE 5 - Parameters for RFID Business Case in Fashion and Apparel**



Once parameters have been set up, a specific business case can be developed on the basis of the methodology outlined in Figure 6.

**FIGURE 6 - Steps for Making the Business Case for Fashion RFID**



## RFID Standards and Regulations Evolution

The debate over the maturity of RFID, still often considered a non-standardized technology, has long been one of the major obstacles to its deployment. Facts belie this misconception:

- The high-frequency technology has been standardized since 1999 (ISO 15693).
- ISO (15961, 15962 and 180006-C ) and EPC global (a joint venture between UCC and EAN International) have issued standards for UHF (EPC Gen 2) that are now widely used, particularly in the retail sector.
- Today, UHF technology standards are widely used in the United States and Europe, and retailers now have access to a broad range of fully compatible materials. With the use of RFID technology, supply chains now own a powerful tool that allows IT systems to efficiently take up the challenge of moving from mass distribution to a “global yet individualized” approach to distributing goods.

While a lot of ground has been covered, there still is more work to be done. With the success of the EPCglobal standard, EPC is now working on publishing a new standard for HF technology.

And only recently, EPCglobal released the EPC Information Services (EPCIS) standard. This allows companies to exchange meaningful event information (receiving, storing, shipping, etc.) in a standardized format, thereby opening the way to more extensive collaboration among companies.

Equally important, the European Telecom Standards Institute (ETSI) is close to ratifying an interpretation of the regulations in the UHF spectrum that will improve the performance of RFID considerably, especially in areas with many RFID readers, a.k.a. dense-reader environments.

Apart from the standards, there are a few differences in the regulations with regard to the use of radio frequencies. While HF can be used anywhere in the world under the same conditions (i.e. unique frequency of 13.56 MHz at the same power), UHF is still dependent on national regulations.

The United States allows the use of UHF in the bandwidth 902-928 MHz, whereas most European countries have now adopted the 865-868 MHz bandwidth, and Japan uses 950-956 MHz . This, of course, may hamper the use of the UHF technology in the context of an international flow of merchandise. However, technical solutions exist such as “wide band tags” that can be read in the bandwidth 860-960 MHz, thus covering the entire spectrum.

Additionally, some of these tags can now be integrated into labels for the fashion and apparel industry.

Dual readers (i.e., dual frequencies in a single infrastructure) also exist that will allow the retail business to identify both HF and UHF tags without having to rely on different hardware.

## What is RFID ?

The literature about RFID is quite abundant, but we’ve singled out a few key points below:

- ✓ An RFID (radio-frequency identification) tag/label is a tag that has, at least, an identification number that can be electronically read at a distance even when not visible.
- ✓ RFID tags have few problems of orientation and obscuration when compared with barcodes, magnetic stripes, etc. Thus, they can be used for more than just tracking or payment.
- ✓ RFID tags can include electronic chips, data storage, a local power source and other features that make them very versatile.
- ✓ RFID systems are comprised of tags, readers/writers to identify and communicate with the tags and a controller that manages the information interface with a computer system.

The advantages of RFID are that it allows a mass reading of objects without any “line of sight” and that it allows a unique identification of objects. The chip in the tag can contain a unique identification number. Two items with the same reference, same size and same color can then be individually identified by using this unique feature.

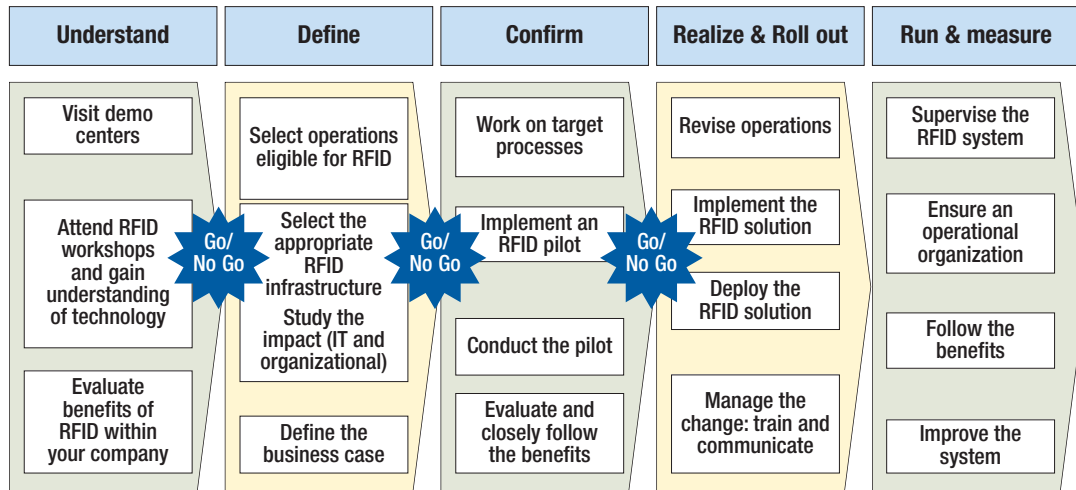


The benefits of the RFID solution will be assessed and confirmed in parallel with a step-by-step approach that includes understanding the technology and its benefits, defining RFID as it applies to your organization, confirming its effectiveness through pilot programs and evaluations, strategically rolling out the solution and carefully measuring results.

Based on results at each stage of this process, a decision can be made to continue or terminate the project.

Specifics of this approach are outlined in Figure 7.

**FIGURE 7 - Implementing RFID: A Pragmatic Approach**



**ABOUT THE AUTHORS**



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Christophe de la Bourdonnaye leads the retail sector for Capgemini France. He developed the RFID Proof of Concept for Fashion, a demo center dedicated to the textile and apparel segment that demonstrates the use and business value of RFID along the fashion value chain. He also is developing new business and integration capabilities around many retail hot topics such as loyalty, POS solutions, workforce management, merchandising and supply chain optimization.



**Philippe Fabre**  
Project Manager  
Capgemini

Philippe Fabre is in charge of implementing traceability solutions in several sectors, including the industrial and retail business sectors, for Capgemini Technology Services in France. He led the first RFID pilot in France and has worked on several RFID projects for transport, industry, airport operations and fashion and apparel. Fabre is now in charge of developing the RFID and traceability offering for Capgemini in France. He is also a member of the Fashion & Apparel Shop Level Operations Working Group for GS1.



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Motorola provides proven RFID solutions, enabling new ways to increase revenue, profits, improve operational efficiency, and increase supply chain visibility for apparel/footwear companies. Integrating RFID into retail operations reduces stock-outs and increases customer care. Motorola has the experience to drive item-level, customer facing RFID success within the fashion industry.

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