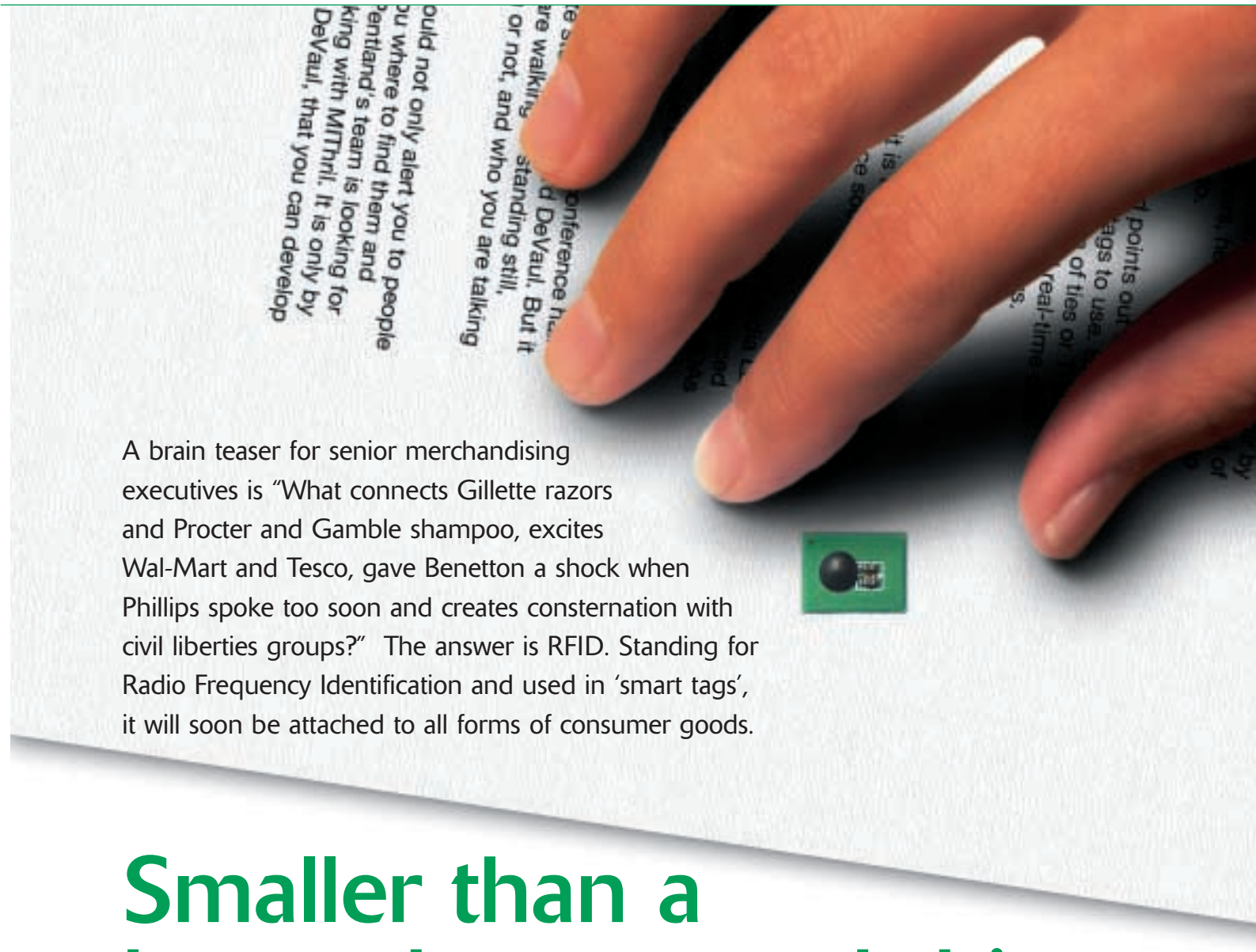


A brain teaser for senior merchandising executives is "What connects Gillette razors and Procter and Gamble shampoo, excites Wal-Mart and Tesco, gave Benetton a shock when Phillips spoke too soon and creates consternation with civil liberties groups?" The answer is RFID. Standing for Radio Frequency Identification and used in 'smart tags', it will soon be attached to all forms of consumer goods.

Smaller than a bar code: yet much bigger

Basically, an RFID tag is a tiny silicon chip or miniature semiconductor not much bigger than a grain of sand. Yet despite the size, it can hold a lot of information. They have already been used as tags on runners in the Boston marathon, in windscreen devices to automatically pay highway tolls, and put under the skin of cattle to stop them double dipping at automatic feed troughs.

But it is as a replacement for the 30-year-old bar code that they start to come into their own. Wal-Mart estimates potential savings of $7 billion by 2007, and a McKinsey report estimates a consumer goods maker and retailer working closely together could make savings of 20-40% by avoiding out of stock costs and making supply chain savings in inventory. With cost such an important driver in the footwear industry and the price of a smart tag low compared to a pair of shoes, we can be sure of hearing and seeing much more of them.

Five billion bar codes are scanned daily worldwide, emphasising this is an inexpensive and efficient technology. But bar codes work best in clean and dry environments and need a clear line of sight in order to be read. They soon lose their integrity if they become dirty, marked, stretched or broken.

Like the bar code, the RFID Smart Tag is also passive and is activated when a Tag Reader is used to interrogate it by broadcasting an RF signal. The tag responds by transmitting data back about itself. Readers may be hand-held and passed close to the goods, or be physically positioned on a production line, on warehouse or shop shelves, or at the check out in stores.

The tag itself normally includes the chip mounted on a resin board, which is also the platform for a coil of copper wire that acts as the

aerial. The smart tag eliminates many of the bar code problems. One of the biggest savings is the fact that a clear line of sight is not needed to read the tag. A pair of shoes with a smart tag embedded in the heel can still be read while in the box.

An RFID chip can hold considerable data and tell the reader not only what it is, but where it came from, who made it and when. This sort of data can also be used to prevent counterfeiting and, indeed, RFID tags are being tested not only with high value consumer goods, but also with bank notes. Supply chain trace-ability is also seen as a useful tool in these terrorist prone days.

An important event in the development of RFID tags was, curiously, the Star Wars films. When Hasbro began producing the Star Wars characters as toy figures they gave them speech. Children who bought the simple hand held readers could pass them near the figures and create a dialogue based on profound statements such as "May the force be with you". These tiny tags placed in the feet of the figures could hold 30 seconds of voice and over four pages of A4 text.

According to Chris Parker - a leading RFID consultant now working in the USA - by 2000, London-based Innovision had produced nearly 100 million tags for Hasbro and the price had dropped below a dollar a tag. This made it possible to start to exploit the technology in other areas. By 2003, it was down to 25-40 cents, with Gillette ordering 500,000 million tags for its razors and other products during the year. Leading the charge for further cost reduction has been MIT, who look to hold more data on the central computer and only a unique identifier on the tag. The Auto-Id centre at MIT has also been working to establish a world standard for tags.

Tags in the supply chain

In the supply chain, tags can follow the goods all the way. Fixed readers on racks monitor goods in distribution centres and on shelves can monitor what is happening in retail stores. This allows fast measuring of what is on the shelves, warning that replenishment is needed, and when linked to checkout data, whether goods are being stolen. UK retailer Marks and Spencer says that 50 of their food containers can now be read at once, taking eight seconds compared with half a minute previously. The tags are added by suppliers and include details on product origin and expiry dates.



Consumer concern

Some say Marks and Spencer also played a part in unnerving consumer confidence when its recently deposed Chief Executive, Roger Holmes, told the Times newspaper in 2003, that they would put tags on clothes so they could tell consumers if the colours matched with the other clothes being worn.

This highlighted the fact that plans were in mind whereby the tags would remain active after the goods left the shop. While there are some creative and useful aspects to this, there was real concern about retailers being able to build such a clear picture of what a consumer buys and how it is used. With readers in the shop doorway, a returning customer might have all her clothes data scanned and available to the shop assistant. With Marks and Spencer most famous for its underwear, that did not come across as a good idea.

And who might be able to lay hands on readers - and how easy would it be to read tags on say banknotes or expensive electronic equipment? Could a criminal just stand on a corner and measure passers by until he found one carrying a large quantity of high value bank notes? It was fears of this sort that made Benetton back away from a test with its garments last year after Philips let it be known it was going to produce a large number of tags for them. Tesco also slowed a test in the UK, and Wal-Mart postponed its trial with Gillette razors, which it had planned in part to reduce theft.

None of these retailers are ready to back off the technology, but they have regrouped to find ways to use it, which are acceptable to the privacy and security of the consumer. The Metro Group in Germany has tests running in three of its Kaufhof stores and in a supermarket dubbed 'Future Store' where new concepts are being tested in conjunction with Intel and SAP.

Perhaps the House of Fraser in the UK has signified how things might work in a trial started early in 2004. Their garment makers in China attach the tags. These are then used for supply chain and inventory control right through to store check out where they are removed for recycling. This sort of action could form the basis of a 'code of conduct' for retailers. It might include electronic ways of automatically disabling the tag— unless the consumer required otherwise, putting tags on the package rather than the article itself, and being sure to tell the consumer that a tag is present on the item.

The future

Testing of RFID tags in Japan has moved faster, as Japanese consumers have fewer concerns about privacy and enjoy new technologies they think may contain benefits. In Japan, tags are not only being tested on goods but also to monitor the movements of school children. We have mentioned some high value uses such as bank notes and toll charges. We could also add areas such as airline baggage, document tracking, ticketing for sports events and access to secure areas.

For the consumers, if tags make it to the home, they can expect to be told by their fridge when restocking is needed or when articles are out of date for eating or drinking. With drinking in mind, the Mitsubishi Electronic Research Laboratories in the USA has developed the RFID iGlass, which is used in restaurants to tell the staff that the customer needs a drink refill!

How long before our shoes will tell us they need a good clean or a new sole?