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The Ubiquitous Chip - Preparing for the Auto-ID Revolution

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When Linda Dillman, CIO of Wal-Mart announced on June 10th 2003 that Wal-Mart's top 100 suppliers would be required to utilise RFID (Radio Frequency Identification) tags on cases and pallets supplied to Wal-Mart by January 2005 she threw the entire retail and consumer goods industry into turmoil. But when a $250 billion turnover giant says jump, even the biggest suppliers tend to reply "How high?"

Wal-Mart was quickly followed by other retailers such as Tesco in the UK. Test orders of bar coded cases are planned to start arriving at Tesco distribution centres in July 2004. Other retailers and buying groups such as the U.S. Department of Defense have announced similar initiatives.

How should manufacturers and retailers respond to these developments? First, consider the consumer angle; secondly, look at the balance of costs and benefits between retailers and manufacturers; thirdly, put together a small group of people to plan how to extract benefits from this new technology; and finally, take some action!

How Does the Technology Work?

RFID devices contain a single chip computer and an antenna, and either actively transmit to receivers (in which case they also have a battery) or reflect transmissions back to a transceiver (passive tags).

Unlike barcodes, the tags can be read without requiring line of sight and they can store much more information.

In a typical scenario, an RF transceiver will send radio waves to the tag to embed information in it such as date of manufacture, best by date etc. As the item (pallet, case or even unit) passes through the supply network, transceivers can interrogate the tag and read the information stored on it, providing real-time visibility of inventory from plants, through distribution centres to stores, and into shoppers' trolleys.

The Consumer Angle

Logically, consumers stand to benefit greatly from the introduction of RFID tagging. They should see lower prices, faster checkout and fresher goods. However, there is a concern among some consumer groups that RFID tagging could allow the purchasing behaviour of individuals to be monitored outside the store. Conceivably an empty soft drink can dropped as litter could be traced back to the purchaser, who could be prosecuted for littering.

Retailers and manufacturers need to consider this angle carefully – perhaps providing de-activation scanners at exits to stores. Failure to take such consumer concerns seriously could lead to a backlash similar to that generated by the 'Frankenstein Foods' media image of genetically modified foods.

The Balance of Costs and Benefits between Retailers and Manufacturers

The major benefit opportunity of RFID lies with retailers, not manufacturers, as the table below shows. In addition, the majority of retailer costs are one-off, while manufacturers face ongoing product cost increases of buying and adding tags to products. Manufacturers are also dependent upon retailer execution to deliver benefits downstream, e.g. closing the last 50 yards between the back door and on-shelf availability. Negotiating a benefit sharing arrangement with retailers should therefore be a top priority for manufacturers.

	RETAILER	MANUFACTURER
BENEFITS	✔ Reduced labour requirement ✔ Reduced error and costs ✔ Improved product availability and sales ✔ Reduction in safety stock and capital employed ✔ Reduction in obsolete stock write-off ✔ Improved stock rotation on shelf ✔ Reduced shrinkage at store level ✔ Reduced need for checkout staff ✔ Increase in available selling space ✔ Faster and more accurate product recall capability	✔ Increased sales from better stock availability at point of sale ✔ Reduced supply chain costs
COSTS	✘ Systems integration costs. ✘ Hardware and network enhancement costs. ✘ RFID readers at regional distribution centres, stores and ultimately shelf level.	✘ Systems integration costs ✘ Hardware and network enhancement costs ✘ RFID readers at plants & warehouses ✘ Tagging equipment costs in plants ✘ Tags

The Consumer Angle

RFID tags have long been used in products such as security ID badges. Though costs have been high, they are now falling: in 2000 a tag cost $1; they now cost around 30 cents each and are widely expected to cost no more than 5 cents apiece by 2007. This cost reduction makes the vision of an item based RFID world plausible, but there is still a substantial cost implication for manufacturers. The leading ketchup manufacturer, for example, makes 650 million bottles of ketchup a year. At 5 cents a bottle for the tags that's a product cost increase of over $30 million a year.

RFID or Auto-ID - What's in a Name?

RFID is a generic term, while Auto-ID is more specific to the passive tags which will be used in the Consumer Packaged Goods industry. It comes from the Auto-ID Center set up by leading technology companies, universities, retailers and manufacturers in 1999 to develop global standards for this emerging technology. The Auto-ID Center was the predecessor of EPC Global which now leads the development of standards for the Electronic Product Code (EPC) Network to support the use of RFID.

Thus, for manufacturers such as typical grocery suppliers who produce high volumes of relatively low cost items, the incremental cost of tagging such items can be significant. Other manufacturers, perhaps cosmetics or razor blade manufacturers, produce lower volumes of higher value products, so the add-on cost of a tag will be less significant. Overall, however, tag cost reductions are fundamental to the growth of RFID tagging.

The reliability of tags is also a limiting factor currently. A pilot test by the Auto-ID Center in October 2002 found that only 78% of pallets tagged were read accurately. When pallets were double tagged, there was still a 3% failure rate. Until reliability, tamper-proofing and robustness improve, widespread use of tagging, even at pallet level, will not happen because data accuracy is critical to extracting cost savings from such supply chain automation initiatives.

There will also be substantial costs involved for manufacturers in upgrading existing ERP and data warehousing applications to handle RFID data. Additionally server and network infrastructures will require upgrading to store, and allow interrogation of, the mass of data generated at 'unit level' detail.

Manufacturers therefore should proceed cautiously, setting up a small team to study the overall business implications of any RFID project and building a robust business case before proceeding further.

The IT Angle

IT companies such as SAP see Auto-ID as the key to a fully integrated supply network. So they have been investing heavily in developing common standards and technology to link existing ERP systems to RFID technologies.

The METRO Group – SAP, Intel and more than 40 other companies – set out to implement leading-edge retail technology in a real-life setting in the METRO Group Future Store which opened on April 28th 2003 in Rheinberg, Germany. About 1700 products sold at the Future Store have RFID tags, helping to track and trace items as well as build a more efficient and adaptive supply chain from the distribution centre in Essen to the store. Products are tagged at the pallet, case and item level.

More recently, SAP announced the launch to pilot customers of its SAP Auto-ID Infrastructure in January 2004, with wider availability due in mid 2004.

The new solution allows management and communication of RFID data through Auto-ID connectors for SAP R/3 and mySAP ERP. As well as tagging pallets and shipments to provide compliance with the Wal-Mart mandate, companies will be able to extract more information from their supply networks, exchanging data collected by RFID technology with data held in existing ERP systems and data warehouses.

The Auto-ID Dream Is Almost Here

The day is fast approaching when Auto-ID will be fully operational. Picture the scenario:

Products are chipped at manufacture. The chips are coded with relevant information as products leave the plant.

At the retailer's distribution centre, the contents of pallets are automatically scanned at goods inwards - generating goods receipt notification and invoice approval, allowing cross-docking onto the appropriate truck without unpacking, putting away and subsequent picking.

At the store the part-empty shelf is signalling to the back door that the items are required, and as they are received (again automatically); staff are notified that these items are required on shelf immediately. The consumer fills their trolley and proceeds to the checkout area where all the items (including those which would previously have been 'accidentally' left in the trolley) are automatically scanned, and payment is taken electronically. Results: lower costs all round, better use of staff and space, and less time and effort for the consumer.

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