RFID – Prophet or Profit?

Critical Weaponry or Flawed Genius?

Hailed as the brilliant cure to the logistical nightmare of supply chain visibility RFID visionaries promised to resolve the issues presented by conventional tools that failed to provide end to end traceability.

It's true that despite the commitment and investment by the global giants including Wal-Mart, Tesco and Metro A.G., RFID never resulted in universal success or global supplier acceptance, but it did highlight the critical elements required to fuel a successful outcome.

In this paper we present the views of critics, and advocates who maintain that RFID is robust and, in skilled hands, can deliver highly tangible cost benefits and vital improvements in critical closed loop situations.

RFID – Visionary Thinking

RFID technology stamps each product, crate, pallet or truck with its own 'ID card' (a tag) which carries (and in some cases, record) copious amounts of relevant supply chain information, for example, individual point of manufacture, type, weight, component inventory, test standard, distribution history, upgrade version, and maintenance schedule. Tags can be applied to anything – from a book to a piece of luggage – a can to a crate – an individual product, shipment or loaded vehicle. Best of all tags can be read hundreds at a time, out of line of sight.

Unlike conventional 1D barcode labels, tags are not destroyed by extremes, such as high heat or intense cold, making them ideal for withstanding extreme production methods. The information integrity resides on the chip within the tag which either transmits information ('active' tag powered by a tiny battery) or reflects information ('passive' tag with no battery) or is a battery assisted tag (BAP) – a hybrid of the two - back to the interrogating unit (RFID scanner).

Further, RFID tags can be read from a distance, although the more information required to be stored and the more distant the required reading range the more expensive the tag, which costs a few pence for a passive tag to £40-£50 for a high grade active tag.

Tags are read by either fixed scanners, (sometimes known as gates), which are placed in positions to record all tags entering or exiting their 'zone'; or by handheld or vehicle mounted mobile RFID units.

The cost of the RFID tag has always been a barrier to its universal acceptance, although now experimentation is taking place with electronic inks, which if successful, will bring down lifetime costs and considerably improve its chances of mass adaptation.

Still most tags can only be accurately read from 2meters – 5 meters, and problems incur with tags affixed to metal cans, which limits the use of RFID within the supermarket supply chain. Given the current status of technology RFID will, at best, only replace 10% of traditional bar codes by 2015 (AIM Intl).

Nevertheless IDTechEx estimated that the value of the RFID market in 2010 was $5.63 bn up from $5.03 bn in 2009. Its main use is still within smart cards, smart tickets, and on cases or pallets. 300 million alone were used in apparel tagging, with most of the growth being attributed to cheaper passive labels.

RFID – Sixty Years of Innovation

Like any modern technology RFID's roots can be found way back, in this case in WW2, when it was used to distinguish enemy from friendly aircraft. Early versions used a simple transponder imbedded in the plane's fuselage, which reflected a static ('passive') signal or broadcast an ('active') signal. Simple versions were first used commercially on items to detect theft from stores in the 50's and 60's and electronic door-keys using RFID were introduced in the early 1970's. Smaller low frequency adaptations were developed (as chips) to identify animals later that decade.

In the 90's IBM engineers developed the first high frequency, fast data transfer versions which are the forefathers of those used today. IBM subsequently sold its patents to Intermec in the mid 1990's. However the famous RFID engineers Sarma and Brook recognised its potential, adapted versions for use in the movement of goods, and realisation of its true commercial potential began to take form.

The Wal-Mart project began in 2005, and was championed at the highest level and managed by its' IT department. Wal-Mart's objectives was to role out RFID within the supply chain, and empower members to tag 100,000 items, and all crates and pallets, and implement an RFID infrastructure that would revolutionise the industry.

Following a series of trials in 2007, suppliers resisted the change due to the project cost and complexity of implementation, particularly in light of the recessionary climate of 2008. In 2009 Wal-Mart reduced its supplier penalty from $2.00 per pallet for non tagging crates and pallets to 12 cents, while it reviewed its product tagging mandate.

As a result the critical mass Wal-Mart tried to establish was never achieved and insufficient retailers joined the fray. However in 2010 its CIO announced that 'Wal-Mart is still bullish about RFID", and extended the technology to its jean suppliers. New software and hardware is reading tiny tags when goods enter the store to provide on floor traceability, signal replenishment and identify missing items.

Other industry giants embracing RFID included Tesco, (who ordered 4000 scanner units in 2005) Metro, Best Buy, and Target. All ran trials geared to resolving theft and out of stock issue for retailers (which remains a stubborn 8%, and up to 20% in times of promotion). The implementations are mainly focused to resolve the issue of 'customers that walk' to other stores, or swap manufacturer allegiances, as this spells loss of revenue for manufacturers and suppliers.

RFID – Crossing the Event Horizon in non Retail Applications

Broadly RFID, in its simplest form has been very successful. It is used in car anti theft and tracking devices, by farmers who tag livestock to meet regulations and by scientist to track habits of wild animals. It's highly likely that if your dog will have been 'chipped' with owner and breed details using RFID.

It's used widely for asset tracking for high value drugs in hospitals, in many libraries to limit the theft of valuable books and in contactless payment systems.

It is used in challenging manufacturing processes, to record test data and ensure a high degree of quality control. Tags are placed on high value goods for ease of recognition, to limit theft losses and implant production information to assist ongoing ease of maintenance.

Several large (non retail) projects using RFID have been successfully commissioned including:

New York Road Tolling	**Affiliated Computer Services**	**$500 million**
US Army Asset Tracking	**Savi Corporation**	**$480 million**
E-passport Infrastructure UK	**Raytheon Consortium**	**$184 million**
4 Chinese City Libraries		**$ 65 million**
E-passport Infrastructure USA	**Unisys**	**$ 62 million**
Moscow Rail e-tickets	**UPM Raflatac**	**$ 60 million**

Supremely Adaptable in Closed Loop Situations

The RFID implementation process is more complex than conventional RF tagging systems, and reading equipment is more specialised – not all RF scanners can read RFID tags. Case studies have proven its supreme adaptability for projects that are self contained – used within a particular company to support an information critical process.

For example NGF Europe used RFID to ensure high quality control of its manufacture of high specification industry glass cord, used in the automotive industry. RFID was used as RF bar codes were distorted during packing. The system was extended to validate work schedules, manufacturing quality and certification and enhanced traceability – each cord bobbin given a unique and traceable code providing complete visibility of its manufacturing process.

Reiswolf specialise in disposal of highly confidential documents and uses RFID to track and certify safe collection, transportation and destruction of documents from the point of collection to the point of destruction.

Munich Fire Brigade and many others in Europe have used RFID technology to track operational status and maintenance of fire fighting equipment and extinguishers where legal requirements demand that traceability, management and monitoring is flawless.

Yet it remains the province of high value practioners who understand the nature of the problem, the parameters used to calculate ROI, the RF network infrastructure required to support the flow and analysis of information, interaction between software and hardware components and the testing process required to ensure read accuracy under various conditions and use.

Learning from the Big Guns

Although it did not achieve the global 'big bang' anticipated, RFID has been established as a robust platform, and successfully applied and well proven in closed loop situations where constraints of existing technologies (such as RF, Voice or Pick to Light) have failed to resolve issues that are critical barriers to success.

The Bottom Line

Used for specialist closed loop projects RFID technology can be used to resolve some key issues where data recording is an imperative element. However its global acceptance, based on its financial viability in the retail sector, has been limited to higher value items where its cost is better justified.

Although analysts believe that a steady growth will be achieved, the tipping point for global acceptance has not yet been reached, and will require the cost of labels and readers to be considerably reduced for it to do so.

As for its rating as a disruptive technology capable of toppling the paper standard ID bar code technology, the global retailers will undoubtedly signal its wholesale implementation as soon as it is economically feasible, and as yet this has not been the case.

There are certain requirements, generally involving high value goods or critical information gathering processes, where its implementation is necessary and feasible given that the supplier has the appropriate expertise and experience to provide best recommendation and implementation advice guidance and support.

Return on Investment Profile

Using RFID can generate the following cost benefits.

Reduction of supply chain shrinkage - Opportunities for reducing shrinkage within supply chains as a result of diversion of goods or losses, are ostensibly in the region of 50% at case level and between 10-15% at pallet level

Sortation of items - Opportunities for enhancing item sortation processes, such as those encountered in clothing manufacture and distribution, time and associated cost savings of greater than 40% may be achieved

Flexible manufacturing - Opportunities for more item-specific manufacturing operations to be performed using automated read and control functions to achieve more efficient processes, process improvements of greater than 10% may be achieved

Item identification in condition monitoring - Opportunities for improved identification of system components and tools for conditioning monitoring purposes, management may be achieved more efficiently with potential cost savings greater than 10%

Reductions in inventory - Opportunities to reduce inventory by more than 5% or more in appropriately selected circumstances

Improved asset management and maintenance - Opportunities for improved management and utilisation of assets, such as reusable containers, savings in time and associated cost and maintenance could be greater than 10%

Enhanced field services - Opportunities for location, plant and item tagging that can facilitate more efficient and effective field maintenance and support services, savings in time and associated costs could be greater than 20%

Labour and more efficient time-and-attendance management - Opportunities for improved labour management and associated costings yielding savings in excess of 20%

Belgravium Technologies Ltd is a world leading specialist innovator and manufacturer of ruggedized wireless driven technologies and scanners for industry. Often used in extreme conditions, Belgravium RFID scanners are manufactured using tooling techniques and components of the highest quality to ensure reliability, long life, and durability to secure accuracy and low lifetime costs for customers.

Proteus Software Ltd has been an established author of warehouse management systems and software for more than 25 years. The software helps control over 5 million sq ft of warehouse space across the UK, Ireland, South Africa, France, Italy, Germany, Russia and the Far East to support the warehousing operations of BP, Danone, Sony, Metro, GlaxoSmithKlein and Whyte and Mackay. To maintain its global customer base Proteus has established centres of excellence in Europe, Asia Pacific, Africa and Eastern Europe.

Belgravium and Proteus jointly have over 50 years experience in the development and implementation of warehouse management solutions and the expertise to help enable customers to make the critical leap that accelerates profitability, creates investment capital and accelerates growth rates beyond that of their competitors.

Sources

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