

RFID

Technology is an important driver in global business. CIPS considers RFID as one of a suite of technological tools, the application of which has the potential to enable the supply chain to operate more effectively.

RFID tagging is a form of Automatic Identification and Data Capture (AIDC) technology, where data on a particular item is stored on a tag. The tag will be attached either to the item itself or to the packaging (whether to the container, pallet or outer/inner packaging). As the items move within the supply network an RFID reader is able to communicate with the tag via a radio frequency link and identify the object to which the tag is attached. The principle is similar to the more familiar bar code, where data is transferred optically¹. The RFID reader then transfers the information to a network or computer management system for processing and final application. RFID tags can either be classed as “active” or “passive”. Active tags will be battery powered and contain a semiconductor chip with a memory storing capability (configured to read or read/write), and incorporate an antenna for transmitting information. In contrast, passive tags will be more limited in their applications and have a lower individual cost.

The technology and operating frequency of the tag are key variables that define the potential use of a specific tag. RFID tags are programmed to operate at different frequencies. As a general rule, the higher the frequency, the greater the range the tag can be read². So for example, at low frequencies (125kHz) the operating range is under 1 metre enabling the penetration of some non-ferrous metals. Disadvantages include the slow transfer of data and the large size of the RFID tag. Mid range frequencies (12.56MHz) give an operational range up to 1.5 metres. Ultra High Frequencies (UHF) of 800-900 MHz can be used at a distance of up to 4 metres between tag to reader and identity tag. High operating frequencies (for example, 2.45 GHz) allow an operating range beyond 10 metres, with the fastest rate of data transfer, but reduced operational abilities through mediums including glass. There are also potential health issues,

for example, around operating at high frequencies. Mid range frequencies are currently providing the best compromise between speed of operation and cost, and size of tag and cost.

The benefits of RFID

Supply chains and networks are increasing in their levels of sophistication, with customers demanding their needs are met to exacting quality standards, faster than ever before, and more accurately on the global stage.

RFID has been seen as a step change from the bar code. Many logistics applications use a bar code for the marking and identification of products. RFID tags may cost more than bar codes, but the advantages are compelling. They include:

An ability to operate in harsh environments. In contrast a bar code can be defaced or torn.

No need for a direct line of sight with the product. There is a very narrow tolerance limit for reading barcodes. Some major supermarkets in the UK impose financial penalties on suppliers if barcodes on products are unreadable.

The RFID tag can also store more information than a barcode. It is this information that generates valuable knowledge the customer can use for competitive advantage.

At a strategic level, the use of RFID technology in the supply chain enables value creation and helps deliver the following business objectives⁴:

- Increased revenue
- Reduced operating costs
- Optimised employment of assets
- Enhanced safety and quality control.

At an operational level, the benefits generated have included:

- Increased product availability
- Improved utilisation of capital
- Lower total operating costs
- Enhanced safety and quality control.

Issues limiting RFID uptake

The practice guide cites four main factors affecting the uptake of RFID technology:

- Cost – installation and integration of hardware and in training personnel to use the technology
- Lack of a common RFID standard
- Disposal of the RFID tags according to European Union regulations
- Data protection issues related to RFID technology
- The technology for RFID is not an issue - it is here now in a way which works well. The main issue seems to be “what is the business case that delivers the value?” In other words, do the benefits justify the costs
- RFID technology is showing a much shorter development cycle than what barcoding went through. This paper has highlighted some of the barriers to adoption that will have to be overcome before RFID reaches that critical mass of adoption required to generate a step change in its use.

CIPS is working with GS1 UK (the UK authority on global cross sector supply chain standards), the RFID Council, and partners in industry and academia to track and influence developments. There is one thing that is certain: RFID is here to stay and the dynamic nature of its development will be worth watching over the next couple of years.

A more detailed document on RFID is available to CIPS Members on the CIPS website. This guide gives a basic explanation of the technology, with the main focus on the commercial strategic and operational benefits of using RFID. It illustrates the benefits of RFID using case studies drawn from the retail and construction industry and the United States Department of Defense. There is also a consideration of the factors currently limiting the adoption of RFID in the United Kingdom.

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¹*Radio Frequency Identification (RFID), Postnote, Parliamentary Office of Science and Technology, Number 222, July 2004, page 1.*

²*Wilding, Richard and Delgado, Tiago, "The Story So Far: RFID Demystified", Focus April 2004, IOLT.*

³*Hentula, Markku; Tonteri, Hannele; Pursula, Pekka and Montonen Jari, "RFID in Recycling Data Management of Electric and Electronic Equipment", Tekes (The National Technology Agency of Finland), VTT Industrial Systems and VTT Technology, Research Report No. BTU024-051344, 28 February 2005.*

⁴*"Chips with everything", Deloitte MSC Limited (2003).*