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The RFID Opportunity for Healthcare

Author

Catalina Ciolan and **Tosh Sheshabalaya,**

European Association of Healthcare IT Managers,

Brussels, Belgium

Email : c.c@hitm.eu

RFID (radio frequency identification) devices have been visibly gaining acceptance across a variety of industries, principally for supply chain management in fast-moving areas such as retailing.

As a relatively later entrant, the healthcare sector has benefited from more maturity in the technology gained from real-world application, the emergence of second-generation (Gen-2 security standards) and the beginnings of a fall in unit price as the RFID user base has grown.

The Product

RFIDs consist of a tag attached to a product with a microchip, which contains data about the product, and an antenna, which broadcasts this data to a receiver. RFIDs can either be active or semi-active (with an internal power source) or passive (without power), the latter are activated by specific receivers.

In lay terms, RFIDs are futuristic versions of barcodes, and much easier to use – since they do not require a line of sight for scanning. This allows for much swifter product throughput. Indeed, one of its recent definitions is 'The Internet of Things'.

An emerging area is so-called 'chipless RFID'. This allows for identifying tags without an integrated circuit. It is cheaper than traditional RFID and allows tags to be printed directly on to products.

RFIDs are compared on the basis of several parameters, the most common of which are: power output, read distance, receive sensitivity and interference rejection.

Healthcare and RFID

According to some IT industry leaders, healthcare RFID – especially in the area of pharmaceuticals - offers considerable opportunities – given the sensitive role of tracking drugs for product recall.

On the other hand, healthcare also faces some of the greatest legal and technological challenges, for example in the US, in the form of HIPPA (Health Insurance Portability and Privacy Act), which protects patient privacy; as a result, RFID-tagged prescriptions must have guarantees that only a pharmacist will be able to read them.

RFID in Hospitals: Initial Concerns Healthcare RFID applications date back to 2004, when the US Food and Drug Administration (FDA) allowed hospitals to use RFID to identify patients and authorise access to medical records – in addition to its more traditional application in workflow and stock management.

Shortly after, US hospitals also began to implant ('tag') patients with RFID. However, within months, the FDA warned of very serious risks – including adverse tissue reactions, internal "migration" of transponders, electrical risks and incompatibility with MRI scanners.

Such concerns tempered the takeoff of healthcare industry applications. However, RFID is now steadily gaining widespread acceptance – both for tracking supplies and patients at hospitals, and increasingly, as an added layer of security within the hospital infrastructure – in terms of providing physical and network access to staff.

The Sureties of RFID

In terms of patients, the highest receptivity to RFID has been in maternity wards (given fears of abduction), and for elderly patients – especially those suffering from diseases like Alzheimer's. Indeed, by early 2004, certain US hospitals were claiming up to 60% reduction in patient watches, thanks to RFID.

Pilots Set the Stage….

Indeed, in 2005, many hospitals began swapping bar code bracelets with RFID tags. This timing was opportune, as several hospitals were also beginning to implement a wireless infrastructure.

In April, Germany's Klinikum Saarbrücken (see article p.8) became one of Europe's first hospitals to launch an RFID pilot project, which sought to improve efficiency and reduce clinical errors. As part of the project, staff monitored 1,000-tagged patients, using PDAs and tablet PCs and accessed encrypted patient data on their wireless network.

Nonetheless, implementation of RFID in many other hospitals has been limited to closed-loop applications and there are continuing issues related to radio wave interference vis-à-vis other medical equipment, as well as difficulties associated with data integration into existing IT networks. Some IT managers are apprehensive that RFID data could overload their systems, especially if these are centred on legacy systems.

…. For Hospitals of the Future

Others have, however, moved further. At Denmark's Horsens Hospital, all key personnel are now RFID-tracked, and paper and pagers have been wholly eliminated.

Workflow scheduling on operating theatres, for instance, has been directly impacted by software combining a cluster of flat-panel screens, with schedules posted alongside, indicating the presence of physicians, support staff and patients in operating rooms, recovery rooms and wards.

Today, many new hospital projects in Europe are including RFID applications in their building plans – by installing receivers at key points and ensuring connectivity to wired and wireless networks.

The EU and RFID

The EU Commission has highlighted the promise of RFID, but warned industry to pay careful attention to issues of privacy and security.

At the CeBIT Trade Fair in Hanover in March, EU Information Society Commissioner Viviane Reding said that the potential growth of the RFID market was "huge". She estimated a near-15-fold leap from 500 million Euros in 2006 to 7 billion Euros in 2016, and announced the formation of a high-level RFID advisory 'stakeholder group', with representatives from industry and consumers.

Ms. Reding stressed her commitment to avoid 'top-down' approaches and overregulation on RFID. She said the new stakeholder group would advice her, especially on the RFID aspects of privacy and e-security, and these, in turn, would be reflected in Commission recommendations to Member States.

Last year, a consultation on RFID organised by the European Commission found that the public was under-informed and that concerns about RFID systems – especially with regard to privacy - needed to be satisfactorily resolved to ensure that the technology was accepted and utilised to its full potential. At that time, Commissioner Reding noted the need for far "greater efforts to explain the risks and benefits of RFID." It is, she said, no longer "just a playground for technologists and lawyers."

Under the European Union's Seventh RTD Framework Programme (FP-7), RFID research is being focused initially on applications in healthcare, intelligent vehicle and mobility systems, micro- and nanosystems, organic electronics and future networks. At a later stage, the Commission intends to boost funding support in areas such as RFID security, and the development of privacyenhancing RFID protocols and systems.

This is welcome because it shows increasing awareness by the Commission that in the real-world, markets are at least as (if not more) important than technical innovation for its own sake.

In the RFID area, the largest of the EUfunded projects involve seven pharmaceutical and healthcare organisations, which are using RFID to trace drugs from the manufacturing plant to delivery at a hospital or pharmacy. The project is part of a wider initiative known as BRIDGE (Building Radio-frequency Identification solutions for the Global Environment) – a 7.5 million euro, three-year project falling under the ambit of the previous Sixth Framework Programme for Research and Technological Development (FP-6), and aimed at driving acceptance of EPC global standards in Europe.

European Initiatives

European RFID users and vendors have recently launched CE RFID, an initiative for 'Coordinating European Efforts for Promoting the European RFID Value Chain'. CE RFID aims at improving the conditions of competition for RFID technology and its further development in Europe and at reinforcing the political environment of RFID at European level. The initiative contributes to the Working Group RFID/Logistics within the European Technology Platform on Smart Systems Integration (EPOSS). Members so far principally consist of Austrian and German RFID solution providers.

Efforts are also being made to inform users and the general public. In Germany, a website launched at the end of last year by Informationsforum RFID aims to educate the public about RFID applications in everyday life. Informationsforum RFID is also working with partners in the Netherlands (RFID Platform Nederland) and the UK (National RFID Centre), to increase awareness and acceptance of RFID technology and ensure that RFID projects are implemented in a responsible manner.

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