RFID in libraries - introduction to the issues

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1. New technology for efficiency in operations.

New technologies have always been of interest for libraries, both for the potential of increasing the quality of service and for improving efficiency of operations. At the present time, when libraries of all kinds (public, research, special) are facing economic hardships the overwhelming reason for considering new technologies is the potential for cost savings in the operations and the management of material flows.

2. Looking back at bar codes ...

RFID is an identification technology, it does the same job as bar codes but offers potentially a lot more. It can therefore be fruitful to look back at bar code technology and see what we can learn from its application in library operations.

Bar codes is a fundamental technology for library operations and flow management; it provides the coupling between the information system (the ILS, or Integrated Library System) and the physical flow of library material. In applications at the circulation desk bar code technology has been proven to be robust, reliable, and efficient.

In the effort to extend bar code technology to self service stations, which is one major direction for achieving better efficiency in operations, the experiences have been less than satisfactory. Both in my previous position as director of Lund's UB2 (the main library for science, technology, and medicin at Lund University) and the present as director of the Economics Library at Göteborg University the introduction of self service check-out stations

was characterized by much work on our part, very long delays in deliveries of functionality, and a long, long period of unreliable functionality. Trying to introduce self service check-ins was accompanied by even more difficulties.

The cost for the self service stations should also be mentioned. The stations consist basically of the following components: a Windows-PC, a metal cabinet, a (fixed position) bar code reader, and special software. It also has the capability to deactivate the anti-theft device, provided the item (volume) is put in the correct position. The software performs the function of identifying the bar coded item, communicate with the ILS, and react on the reply from the ILS with displaying and printing a confirmation of the ILS action. The software also performs basic house-keeping and has re-start functions. All in all a very small and basic piece of software. The retail price for such a station in Sweden is about EUR 25,000.

3. ... and electromagnetic security systems.

Bar codes cannot be the signal feed for anti-theft systems so the usual combination is to have a combination of bar codes for identification, and some electromagnetic (EM) based anti-theft system. In self service stations the identification system must interact with the anti-theft system so that items have the correct EM state after the circulation transactions, i.e. checked-out item must be deactivated, and returned items activated. In my experience these interactions are still unreliable and lacking in functionality.

As for the signal source for the anti-theft system, i.e. the magnetic stripe, label, or rod, there is a danger of a technology (or system) trap: once the magnetic device is attached to the library item it should, ideally, not be possible to take it away. This, however, makes it difficult to switch to another EM security system, if the signal source cannot be used in the alternative solution. I my experience such interoperability is rare. It is also possible that the option of "ignoring" old magnetic devices (and just add new ones) is not realizable since remaining old devices can interfere with the new ones. In practice it is impossible to remove or exchange, for example, magnetic rods glued into the spine of a book, so the system choice seems to be irreversible.

4. Examining the potential of RFID - list of questions.

The experiences of previous applications of "new" technology, bar codes and EM security, are many disappointments in the system solutions, both in the direct application of the technology and, even more so, in the systems interaction with the ILS. The exception being circulation desk applications with a direct coupling to the ILS.

Since increased efficiency in operations is the primary reason for adopting new technology in libraries there are a number of questions that must be addressed when examining the potential for RFID based systems in libraries.

- **Price:** Will libraries benefit from industry trends towards cheaper components, or will a low number of library oriented suppliers maintain a high price compared to other applications? The expectations of low price must not be unrealistic [McArthur, 2003], but a general growth in the industry should also benefit library applications.

- **Reliability/Robustness:** Bar code systems can be fooled by photocopies, or counterfeit

printouts of the bar code; what are the means to bypass an RFID station unnoticed? A metal (or lead) container? Is there a real danger of a "knock-out device" available to the consumer market as discussed as part of the privacy concerns about RFID in the retailing sector? The worry is that RFID tagged consumer items are traceable after sale which opens up possibilities of unwanted (by the consumer) research. The Auto-ID Center at MIT is quoted to work for a "RFID-chips killing device" for a low cost [Lotsson, 2003]. Potentially big adoptors of RFID technology in retailing applications are sensitive to privacy concerns, for example Marks&Spencer and Benetton; and Wal-Mart "has said publicly that it will not deploy RFID technology it its stores until consumer privacy concerns are addressed." [RFID Journal, 2003 c]. How will these developments affect library applications of RFID?

- Longevity: what is the economic life time of an RFID system? Specifically what is the life time of the RFID tags? Is there a limited number of re-writes before the tag must be replaced? Are there climate factors that affect the wear and tear? What ageing tests have been made?

- Interoperability/integration: The lack of standards is sometimes quoted as a major reason why RFID technology has not reached its potential adoption level. "All existing RFID systems use proprietary technology which means that if company A puts an RFID tag on a product, it can't be read by Company B unless they both use the same RFID system from the same vendor." [RFID Journal 2003 a]. Standards are emerging [RFID Journal, 2003 b], but what is the adoption level of today's suppliers of library solutions? Is the choice of supplier an irreversibel decision?

Will the adoption of the 13 digit ISBN [ISO/TC46SC9, 2003], which hopefully will be swift and total in the library world, bringing compatibility with the EAN system (managed by the Article Number Association in the UK), increase the possibilities for libraries to benefit from developments in non-library applications?

Does the systems communication between the RFID system and the ILS require the use of a proprietary software protocol? What is the cost (and price model) for the license?

Can RFID technology replace EM security functions in addition to replacing bar code identification? Is there, in that case, any risk that installed EM devices (labels, rods, etc.) will interfere and disturb the RFID system?

- Rigidity: What physical requirements does the RFID system impose on the library operations and flows? What software requirements?

- Technology traps: What "permanent" bindings are there to the chosen system solution (or supplier)? Can the RFID tags be used in alternative solutions (from an alternative supplier)? Can future technological developments be incorporated?
How many of the choices made in choosing a particular RFID system are irreversible?

- Return on investment: Can tangible cost savings be calculated/demonstrated? Is it possible, for a specified library type and size, to determine the payback time of the investment?

In this open session of IFLA's Information Technology section (meeting 113 at the 69th IFLA General Conference and Council, Berlin, Germany, 1-9 August, 2003) we have focussed on

RFID technology in libraries, and hopefully the presented papers and the discussions will give the answers to the questions raised above.

References

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