Integrating RFID with Plastic Products and Packaging in the Retail Supply Chain

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A lesson from Alice

“If you don’t know where you are going…

…any road will take you there.”

The Cheshire Cat
The Department of Defense stated it intends to move forward on plans to use active radio frequency identification (RFID) technology to support collaborative military coalition operations with 24 countries (reported in Information Week Feb. 23, 2006).

Carrefour Launches RFID Initiative

Checkpoint Systems, Inc. has signed a strategic agreement with Carrefour, Europe’s largest retailer, to roll out an aggressive source-tagging program to help protect merchandise at the point of manufacture. It will tap into Checkpoint’s global network and provide a benchmark for other global retailers who collectively lost $38 billion to shrinkage last year. (Feb 23, 2006)
By 2014, RFID labels, which accounted for 10% of total smart label demand in 2004, will account for more than 85% of the market, according to a study from The Freedonia Group Inc., a Cleveland-based industrial market research firm.

Smart-tek Communications Inc. has completed an RFID tracking alert and containment system, and is set to begin test trials in China as part of the effort to contain deadly Bird Flu.

Blood bank supplies at Saarbruecken Clinic are now equipped with RFID (radio frequency identification) chips to help prevent mix-ups with transfusions and other blood treatments.
RFID direct benefits

Reducing supply chain variables

- Improved ability to match demand and supply
- Enhanced control of inventory size and velocity
- Improved productivity from source to shelf
- Increased product-shelf availability and sales
- More efficient transportation operations and reporting
- Overall error reduction throughout the supply chain
- More efficient transportation operations and reporting
- Enhanced product traceability
- Ability to measure performance accurately through enabled Business Process Management (BPM)
RFID = Improved Business IQ

RFID gives the enterprise the ability to measure performance accurately through Enabled Business Process Management

Direct RFID benefits can be summarized in this Business Intelligence Model

Business Logic + Events + Monitoring = Performance Metrics
RFID Benefits: Addressing retail supply chain replenishment challenges & opportunities

Eliminating out-of-stocks

Managing the cold chain for perishables
  - Tracking temperature history
  - Establishing cold chain accountability
  - Enhancing shelf & vase life

Reducing shrink & automating discounting
  - Delivering on freshness guarantees
  - Sale before expiration date
  - Reducing labor costs

Trace-back
  - Creating a “safety chain” for food & pharmaceuticals
  - Theft & diversion prevention
  - Counterfeit protection
A recent study performed by the University of Arkansas for Wal-Mart compared RFID-enabled stores with non-RFID stores to see if there were any measurable differences. The RFID-enabled stores showed significant improvements; 16% more products were available for sale. With $300 billion in sales, it takes little imagination to see the immediate benefit for retailers and their suppliers.
RFID value proposition

RFID can improve customer confidence by:

- Delivering present-time information on the location and condition (temperature, humidity, stress etc.) of perishable products moving through the supply chain
- Providing an auditable electronic trail of events from source to consumption
- Lowering the overall cost of goods though improved business process and business work flow through the use of dynamic, event-driven interactive data
Traceability – the ability to identify the source of every ingredient in every product

Trace-Back – the ability to track and trace the products now; to develop a systematic approach to data collection, retrieval and reporting

New rules empower the FDA in a Class 1 recall to potentially impound suspect food immediately

RFID needs to be a major part of a lot-control trace-back plan that could save time, energy and money by making it easier to identify the causes or the lack of causes in an investigation (Guide to Federal Food Safety and Security Inspections, UFFVA, Jan. 25, 2005)

RFID can be a key to protecting a brand’s equity

So what is happening in RFID in the food chain?
Converging imperatives in food supply chains

- Operational Efficiencies
- RFID Mandates
- Changing Business Model
- Global Visibility
- Food Safety
- Brand Equity
- Security Concerns
- Transport Regulation
RFID: Plastic returnable packaging reduces supply chain costs from field to fork

Fragmented supply chain with slow technology adoption rate
Extreme diverse product base (grade, date coding, origin etc.)
Limited bar coding creates huge data synchronization issues
Highly uncertain weather conditions – make plans for yield variable
Commodities pricing business model effects supply chain efficiencies

Ability to match supply with demand is a key competitive weapon
Field-to-grower tracking – potential benefits

- Asset tracking (returnable plastic containers, totes, equipment etc)
- Lot traceability (auditable electronic trail of events)
- “First-Mile” analysis – soil and weather data collection
- Expedited operations
Truck-to-DC tracking – potential benefits

- Order management and fulfillment visibility
- Case-level pipeline visibility (location, condition)
- Metrics for shrinkage / loss prevention
- RFID-enabled shipping & receiving
- Physical location and product-condition data
DC-to-store tracking – potential benefits

Order management and QC data validation
Store / DC automated replenishment
FEFO and product-freshness / shelf-life expectance
Automated receiving and shipping
Potential SKU / grade / age-based pricing
RFID gives granular inventory visibility

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RFID assists in loss detection

COUNT OF CASES IN THE SUPPLY CHAIN

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<--- Still missing 4 cases?
Food supply chain traceability: Stages of Excellence™ 1 & 2

At Stage 1, a company has
• Manual processes for checking and monitoring time, temperature & critical conditions
• Reliance on single source point and simple devices for measurements
• Written reports and record keeping
• Limited hours of food safety training
• Limited process improvement tools

At Stage 2
• Quality control personnel are on site to monitor time, temperature and critical conditions
• Reading of tracking information is computerized
• Loading and unloading, temperatures and critical information is recorded
• There are weekly compliance audits
• Food safety training and testing of all personnel is in place
• There are ongoing educational systems to reinforce cold chain requirements
• There is video monitoring of compliance activities
• Tracking and tracing is via bar code / RFID;
  batch matching of products through the supply chain
Food supply chain traceability: Stages of Excellence™ 3 & 4

At Stage 3
• RFID trace-back planning is an integral part of logistics planning
• Training and monitoring of all critical aspects of the perishable chain, from cooling down of chilled products, to processing facility, to loading out into refer-trucks, to disposition at distribution center, and shipment out to store processing area for display
• Radio-based monitoring of time and temperature
• RFID key performance indicators are developed and implemented

At Stage 4
• RFID perishable supply chain management is an integral part of information management and transportation system
• RFID / GPS (Global Positioning System), wireless-based local area network for sending and receiving information from all critical parts of the supply chain
• Identifies and communicates vehicle, pallet and case positions via GPS
• Wireless downloading of data, monitoring time and temperature 24/7
• A system automatically alerts owner when operating conditions are exceeded
• Appropriately documents temperatures during trips
• Planning system integrates across the supply chain
So what are the key components in an RFID Implementation?
12-step process for RFID implementation

1. Build your team
2. Define business requirements
3. Environmental assessment
4. Determine data stream
5. Develop data safety plans
6. Initiate POC plan
7. Pilot product criteria
8. Evaluate RFID hardware
9. Evaluate tag placement
10. Evaluate labeling solutions
11. Analyze effects on IT
12. Analyze full-system feasibility
1: Build your team

Build a cross-functional team with executive sponsorship. RFID is an enterprise level-changing technology which requires interactive collaboration from each operating silo.
2: Define business requirements

Analyze and define the business requirements that RFID is to meet in the “As-Is” and “Future” states. Then develop an RFID roadmap to “connect the dots.”
3: Environmental assessment

Review blueprints of business facilities to see where RFID might best fit. Perform an environmental radio frequency (RF) site assessment to determine optimal areas and “quiet RF zones” with minimal interference.
4: Determine data stream

Determine how the data is to be collected, directed, and managed in the enterprise. What data is needed, when, and where? Is the RFID system seen as a stand-alone, or to what extent does the system need to be integrated into the enterprise?
Develop complete data integrity, security, and disaster recovery plans for an RFID system and for each system component.
6: Initiate POC and implementation plans

Initiate a Proof of Concept plan based on measurable criteria, and an initial RFID implementation plan.
Select and profile products to be used in the first stages of the pilot.

What is the water content? Is metal foil packaging used? How many different packaging variables and processing options are there?
8: Evaluate RFID hardware

Test and evaluate mobile and stationary hardware readers using specifications derived from business requirements.
9: Find best RFID tag placement

Test and evaluate RFID tags in a material handling environment to determine best placement for cases and pallets.
Test and evaluate printer and labeling solutions.
Analyze RFID effects on the IT infrastructure, communications systems, and network bandwidth. Identify resource requirements and associated costs.
12: Analyze full system implementation

Analyze full RFID system implementation feasibility, and develop continuous improvement plans for each functional area.
Lessons learned

- RFID is an enterprise-changing technology that needs an adaptive plan.
- Lock-in on a baseline level of performance and follow closely the improvements that will be coming at a rapid pace.
- Take a continuous-improvement approach; patience and persistence wins.
- No one has all the answers; find the experts that can shorten your path to success.
- Make sure that all solution stakeholders are members of EPC Global.
- Trust companies that have the resources to support your company’s efforts today and tomorrow.
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