



Chartered Institute of
Library and Information
Professionals

Is There ROI in RFID?

Video Conference

November 13, 2007



Boston • Dubai • Shanghai

Who We Are

- Supply Chain Research
- Supply Market Forecasts
- Supply Chain Consulting



Agenda

- A note on the technology
- Experiences outside of libraries
- Library case studies
- Thoughts on privacy and security
- Recommendations

Technology – Important Distinctions

- RFID
 - Active vs. passive
 - Sensors: Temperature, Light, Humidity, Pressure, Vibration, Sound, Acceleration, Existence, Draw, Motion, Air exchange, Explosives, Location, Radioactivity
 - Read vs. read-write
 - Finite vs. rechargeable battery
 - Continuous vs. intermittent transmission
 - Middleware vs. Object Naming Service
 - Number of bits per tag: 75-1,024
- Bar codes
- Electro-Magnetic

Experiences outside of libraries

Early stage of adoption

- 65% have studied it
- 14% deployment rate
- 34% pilot studies
- 74% did not calculate any ROI
- 50% feel it will add “moderate” value

The Wal-Mart Mandate

LOGMARS and EPC Mandates

- 2003 EPC standard
 - Albertson's
 - Best Buy
 - Coca-Cola
 - Department of Defense
 - Gillette
 - Target
 - Wal-Mart



Wal-Mart Current Status

- Top 300+ suppliers → 600
- 23,753+ tagged pallets
- 663,912+ tagged cases
- 5 million+ tag reads
 - > 90% for cases on carts
 - 95% on conveyors in DCs
 - 66% on cases in pallets
- RFID data available to suppliers within 30 minutes via extranet

Pilot Programs

Non-Airline Deployments

- Chevrolet
- Good Shepherd Hospital
- Marks & Spencer
- MasterCard
- Pakistan passports
- Port of Long Beach
- Purdue Pharmaceutical
- Shanghai Masters Cup
- Tesco
- TNT Logistics
- UPS
- Velje bus terminal
- Virginia drivers license

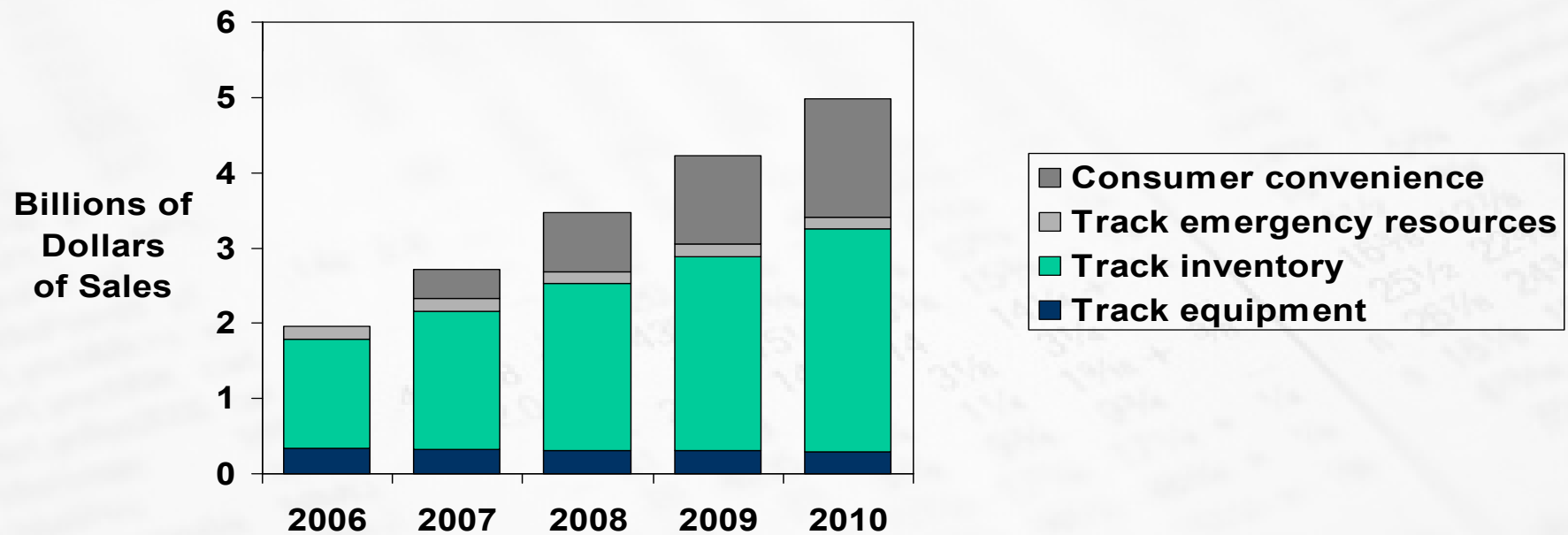
Used For:

- Tracking Equipment
- Tracking Inventory
- Deploying Labor
- Tracking Production
- Tracking Devices
- Monitoring Access
- Speeding Interactions

Strong growth (on a small base)

- Security imperative
- Lower costs

RFID Market Size



Source: Boston Logistics Group, Inc.
Note: Excludes consulting services

Case Studies

International

- Implants
- Consumer goods
- Retailing
- Document management
- Perishable logistics
- Promotion management
- Fleet equipment

Domestic

- Emergency or safety item location
- Picking management (warehousing)
- Security (chain of custody)
- Quality management/manufacturing process control

Inventory: Solid ROI for \$ Items

- Orthopedic implants
- Problem: Pipeline stock of high-value items
- Solution and Cost: \$260,000
 - 250,000 items tagged
 - 7 tunnel readers
 - Software
- Benefit: \$250,000
 - 5% savings on \$50M inventory @ 10%
 - 20% less overtime counting returned items
- ROI: 101%

Inventory: Solid ROI for \$ Items

- Hospital
- Problem: Misplaced medical equipment inflates rental costs.
- Solution and Cost: \$560,000
- Benefit: \$1.2 million
 - 5% reduction in 5,400 30-day leases @ \$4,500 each
- ROI: 107%

Inventory: Retail Collaboration

Large CPG Company

- Problem: Compliance
- Solution Cost: 1.0x
- Benefit: 0.08x
 - Labor savings at DCs
 - Deductions
 - More promo sales due to fewer out-of-stocks
- ROI: -7% to -5% *before* deductions, promos.

Large Retailer

- Problem: Out-of-stocks
- Solution and Cost: 8.2x
- Benefit: 3.4x
 - 10-20% fewer out-of-stocks (stock-outs = 3-8% of sales)
- ROI: 15% - 170%

Las Vegas Airport

- 73,000 bags per day
- 35,000 on RFID today
- \$125 million program
 - 6 buildings, conveyors, RFID antennas
 - \$94 million from Transportation Security Administration
- 100 million Matrics tags
 - 5-year agreement for Symbol tags and readers
 - Not EPCGlobal
- Cooperation with Amsterdam and Narita
- 99%+ read rate

Library case studies

Selected deployments

- Netherlands –
countrywide deployment since 2002
- Vatican
 - 30,000 of 40m items tagged; 2m target
- Kent District MI
 - 4.5m items, 5 readers
 - Reduction of circulation staff through attrition
 - Rollout to branches
- Darien CT
 - 30% reduction in staffing at Circulation desk
- Falls Church, VA
 - 335,000 items
 - Check-in 56% faster
 - Check-out 38% faster
 - Shelf-reading accuracy up 23%
 - Lost items were found

Catholic University of Leuven

- Problem: New library
- Solution and Cost:
 - Solution implemented in 2002
 - 200,000 tagged, out of 1m books
 - \$0.50/tag
 - 3 readers (2 check-out, 1 check-in)
- Challenges
 - Reading piles of books (distance from reader)
 - Multiple generations of tags
 - Taking inventory on shelves (bad read angles)

Olin College in Boston

- Problem: Looking for more efficiency & greater convenience for students
- Solution and Cost:
 - Since 2002
 - Self-checkout RFID for 24/7 access
 - 80 cents/tag
- Benefits:
 - Reduced labor costs
 - High level of accessibility
- Challenges
 - Can only check out 1 item at a time

University of Nevada at Las Vegas

- Problem: Missing books and lack of organization
- Solution and Cost:
 - Since 2002
 - 1,000,000 items tagged & tattle taped
 - 6 handheld readers
 - 5 readers at circulation desks
 - Software
 - Service contract
- Benefits:
 - Reduction in risk of loss (\$40k based on finding items that were thought to be missing)

Libraries compared to other applications

- Longer tag life vs. consumer products logistics
- Shorter read range vs. leisure, transport, and other applications
- Fewer entry/exit gates than most security and supply chain situations

Common challenges

- Investment cost
- Interference
 - Anti-collision algorithms improved
 - Tagging several inches from the bottom prevents interference with metal shelves
- Privacy
- Standards
 - China: UHF 840 MHz-925 MHz
 - Europe: UHF 860 MHz
 - US UHF 920 MHz
 - ISO HF 18000-3 and UHF 18000-6 tags

Where benefits can be found

Range of Potential RFID Applications and Benefits

Application	Benefit	Financial Metric
Speed transactions	Throughput ↑	Convenience ↑ Revenues ↑
Security / access monitoring	Violations ↓	Losses ↓
Reduce inventory	Turns ↑	Working Capital ↑
Reduce labor	Productivity ↑	Costs ↓ Profits ↑

Payback – worksheet

Small Library Large Library Library Network

Costs

# Tags	20,000	1,000,000	5,000,000
Cost/ Tag	\$ 0.80	\$ 0.30	\$ 0.15
Tag Cost	16,000	300,000	750,000
# Readers	2	6	60
Cost/Reader	\$ 2,500	\$ 1,500	\$ 1,300
Reader Cost	\$ 5,000	\$ 9,000	\$ 78,000
Software	\$ 500	\$ 500	\$ 2,500
Installation	\$ 1,000	\$ 50,000	\$ 125,000
Power Supplies	\$ 500	\$ 3,000	\$ 30,000
Total Investment	\$ 22,500	\$ 359,500	\$ 955,500

Benefits

Avg. Annual Loss Rate	1%	1%	1%
Avg. Replacement Cost/Item	\$ 25.00	\$ 25.00	\$ 25.00
Annual Total Loss Value	\$ 5,000	\$ 250,000	\$ 1,250,000
FTEs Avoided	1	25	62.5
Fully Loaded Value/FTE	\$ 30,000	\$ 30,000	\$ 30,000
Labor Avoidance Savings	\$ 30,000	\$ 750,000	\$ 1,875,000
Total First Year Savings	35,000	1,000,000	3,125,000

Savings

First Year Net Savings	\$ 12,500	\$ 640,500	\$ 2,169,500
Return on Investment (ROI)	56%	178%	227%
Payback Period (Years)	1.8	0.6	0.4

Thoughts on privacy and security

Security and Privacy

- Privacy – mostly benefiting the customers
 - For customers – subject matter not disclosed
 - For libraries – tracking of items
- Security
 - Dual systems keep collections secure
 - EM for security
 - RFID for tracking
 - “Theft bit” can trigger alarms
 - Intentional theft is always possible
 - Overlapping tags
 - Covering tags with foil

Recommendations

Action Plan

1. Target and measure improvements in customer satisfaction and loyalty
2. Conduct a preliminary ROI assessment to verify that volume and scale meet threshold requirements
3. Launch a pilot and independently validate the success and expansion potential

RFID = convenience!

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Industries Served:

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- Process Manufacturing and Conversion: Paper, Pulp, Energy, Packaging, Processed Minerals/ Aggregates, Plastics, Metals, Chemicals
- Transportation: Railroads, Ocean Shipping Lines, Airlines, Trucking Companies, Package Delivery, Intermodal
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