

Business Consulting Services

Auto-ID Center November 2002 Board
meeting Presentation
Phase 2 BCAG White Papers
Cambridge, MA
November, 2002



Agenda

- ❖ •Progress to Date and Introduction to our Phase 2 Papers
- Applying Auto-ID to Reduce Losses Associated with Shrink
- Applying Auto-ID to Reduce Losses Associated with Product Obsolescence



We have worked with over 35 leaders to develop the business cases in our white papers... THANK YOU!

Consumer Goods

- **Coca-Cola**
- **ConAgra Foods**
- **Gillette**
- **Imperial Tobacco**
- **Johnson & Johnson**
- **Kraft Foods**
- **Molson**
- **Procter & Gamble**
- **Unilever**

Retail

- **A&P**
- **Blockbuster**
- **Circuit City**
- **CVS/pharmacy**
- **Defense Commissary Agency**
- **Federated Department Stores**
- **Home Depot**
- **JCPenney**
- **Kroger**
- **Limitedbrands**
- **Shaw's**
- **Staples**
- **Target**
- **Tesco**
- **Wal-Mart**

Technology

- **Alien Technologies**
- **Checkpoint Systems**
- **Display Edge**
- **Escort Memory Systems**
- **Intel**
- **Intermec**
- **Matrics**
- **Philips Semiconductors**
- **RF Saw**
- **RAFSEC**
- **SAP**
- **Sensormatic Electronics**
- **Symbol Technologies**
- **ThingMagic**



Our Phase 1 papers received acclaim from the Auto-ID community and beyond; and our method was rigorous and comprehensive

White Paper Global Distribution Community

- Sponsors, Trading partners, Other interested commercial organizations & clients of IBM Business Consulting Services
- Technology vendors
- Publications
 - Number of influencers and popular press articles including the London Financial Times, Canadian Grocer, Consulting Magazine, Executive Technology, the RFID Journal and Supermarket News
 - Number of Trade Association presentations

White Paper Methodology

- Extensive participant list
- Cross-industry perspectives
- Early adoption focus
- Comprehensive business case analysis across the value chain
 - All benefit categories, system wide cost analysis, NPV etc.
- Process and technology blueprints



Driving forward our leading edge research, our Phase 2 analysis is based upon seven hypothetical value chains feeding into a multi-category retailer

We leveraged the grocery-based value chain of our first two white papers to develop an expanded model representing a supercenter environment with seven product categories

| | Grocery | Apparel | Consumer Electronics | Health and Beauty | Music and Video | Pharmacy | Toys |
|--------------------|---------|---------|----------------------|-------------------|-----------------|----------|---------|
| Avg. Price / Item | \$1.75 | \$14.00 | \$130.00 | \$9.00 | \$18.00 | \$26.91 | \$18.00 |
| Items (MM) | 8,000 | 667 | 65 | 726 | 259 | 312 | 363 |
| Mfg Plants | 4 | 3 | 3 | 3 | 4 | 4 | 4 |
| Mfg DCs | 10 | 4 | 3 | 5 | 4 | 5 | 4 |
| Retail DCs | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Retail Stores | 800 | 800 | 800 | 800 | 800 | 800 | 800 |
| Relative Sales (%) | 24.2 | 16.1 | 14.5 | 11.3 | 8.1 | 14.5 | 11.3 |

Source: Company interviews, IBM Business Consulting Services analysis



Average price per item is a primary factor in determining the economic feasibility of implementing Auto-ID at item level



Based on our hypothetical supercenter value chain, our new analysis indicates a compelling value proposition for both case and item tagging across almost all categories

Total Value Chain NPV (in \$MM)

Table 4: (Figures in \$ millions, NPV over seven year period)

1. Grocery
2. Apparel
3. Consumer Electronics
4. Health & Beauty
5. Music & Video
6. Pharmacy
7. Toys

| ADOPTION LEVEL | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|----------------|--------|-----------|---------|--------|--------|--------|-------|--------|
| BEST CASE | PALLET | 4.5 | 8.0 | (33.2) | (14.3) | (48.0) | (2.9) | (14.9) |
| | CASE | 789.0 | 731.4 | - | 519.4 | 235.3 | 645.8 | 521.8 |
| | ITEM | 583.3 | 1,039.4 | 801.4 | 675.5 | 540.6 | 890.8 | 772.5 |
| BASE CASE | PALLET | (1.4) | 6.8 | (33.9) | (14.6) | (48.0) | (3.0) | (15.6) |
| | CASE | 575.0 | 718.6 | - | 510.6 | 234.4 | 643.7 | 511.8 |
| | ITEM | (1,212.6) | 808.6 | 779.3 | 427.5 | 453.4 | 785.2 | 644.9 |

Best case uses more aggressive tag cost estimates as quoted by industry players for large volume users (\$.075 in 2003, \$.05 in 2004, \$.02 thereafter)

Base case refers to Auto-ID Center's tag cost estimates (\$.30 in 2003, \$.20 in 2004, \$.10 2005 and \$.05 thereafter)

- These results represent “Version 2” of the results presented in the Prelude to our Phase 1 papers
- Results are full updated and reflect our latest insights on Shrink, Product Obsolescence, and the host of other benefit categories and cost buckets
- We have calculated costs, benefits and NPVs for all the product categories listed above



Summary of Key findings from the New Papers: Shrink and Product Obsolescence

•Shrink

- Greater total benefits than obsolescence
- Shrink benefits accrued in the greatest volumes at the retailer

•Product Obsolescence

- Significant incremental benefits exist for implementing Auto-ID within specific product categories – for example apparel, consumer electronics and foods
- Retailers accrue the majority of the associated business benefits

Our strategic conclusion stands firm – the business case exists today for Auto-ID implementations at a pallet and case level, and also for most product categories at an item level



Agenda

- Progress to Date and Introduction to our Phase 2 Papers



- Applying Auto-ID to Reduce Losses Associated with Shrink

- Applying Auto-ID to Reduce Losses Associated with Product Obsolescence



We have identified five primary categories of shrink in the consumer goods and retail value chain

Non-Malicious Shrink

Process Failures

Focus on Manufacturers

Malicious Shrink

External Theft

Internal Theft

Supplier Fraud

Focus on Retailers

Non-Malicious Shrink

“Paper Shrink”

Selected Sources of Shrink Related Losses

- Delivery errors
- Improper accounting of returns
- Incorrect inventory audits and on-hand adjustments
- Intracompany & interdepartment transfers

- Shoplifting
- Fraudulent returns
- Burglary

- Product theft
- Collusion with customers
- Collusion with vendors

- Phantom delivery
- Invoice errors
- Returns
- Over/Under delivery

- Pricing errors
- Scanning errors
- Unrecorded returns
- Incorrect store physical inventory



Shrink continues to be a major issue for the global consumer products and retail industries

Table 7:
Hollinger, R. & Davis, J. (2001)
National Retail Security Survey

Beck, A. & Bilby, C. (2001)
Shrinkage in Europe, A Survey of
Stock Loss in the Fast Moving
Consumer Goods Sector, Brussels:
ECR Europe

| SECTOR | SEVERITY | CATEGORIES | COST | | | | THREATS | SOLUTION |
|-----------|---------------|----------------|---------|-------|--------|-----|--|---|
| | | | USA | USA | EU | EU | | |
| MANUFACT. | Malicious | External | | | \$0.39 | 11% | Collusion Theft of Stock Grazing Collusion | Procedures Technology Equipment Routines People |
| | | Internal | | | \$0.39 | 11% | | |
| | | Supplier Fraud | | | \$0.00 | 0% | | |
| MANUFACT. | Non-Malicious | Process Errors | | | \$2.73 | 78% | Incorrect Invoice Incorrect Pricing Damages | Procedures |
| RETAILER | Malicious | External | \$10.23 | 30.8% | \$5.34 | 37% | Shoplifting Returns Grazing Till Snatching | Procedures Routines Technology Design/Layout |
| | | Internal | \$15.24 | 45.9% | \$3.46 | 24% | Stock Theft Grazing Collusion Theft of Cash | People Procedures Technology Equipment |
| | | Supplier Fraud | \$1.70 | 5.1% | \$1.73 | 12% | Phantom Delivery Invoice Error Returns Incorrect Delivery | Technology Procedures |
| RETAILER | Non-Malicious | Paper Shrink | \$5.81 | 17.5% | \$3.90 | 27% | Price Reductions Pricing Errors Scanning Errors Master File Errors Incorrect Inv Check | Procedures Technology People |

Although existing research focuses on retail, our analysis conservatively indicates that manufacturers lose up to ~.75% of total revenue due to shrink

Table 6: Summary of Global
Retail Shrink Statistics 2001

* Sales and shrink data in billions
of local currency (\$US, €EU, A\$)

| RETAIL SHRINKAGE BY COUNTRY/REGION | | | |
|------------------------------------|--------|-------------|--------------|
| COUNTRY/REGION | SALES* | SHRINK RATE | SHRINK LOSS* |
| US | 1,845 | 1.80% | 33.2 |
| Europe | 824 | 1.75% | 14.4 |
| Australasia | 54 | 1.73% | 0.9 |

Source: National Retail Security Survey, ECR Europe, Australian Institute of Criminology, company interviews, IBM Business Consulting Services analysis



current solutions certainly achieve Partial success, And often with inconsistent performance

MANUFACTURERS

- Fencing off pick/pack areas
- Double verifications of shipments at staging area
- Sample unpacking and reloading of trucks to reduce overages
- Security personnel and CCTV within the DC
- Defensively merchandised shelf and rack designs – even lock and key
- EAS tagging

RETAILERS

- EAS tagging of high risk items
- Store security personnel
- Back-room store CCTV and alarmed doors
- Receipts required as proof of purchase for returns
- Defensive merchandising
- Profiling
- Heightened awareness around key times of the day
- Checkout surveillance.

Manufacturer - “We bring trucks back for audits as they drive out the yard, because we suffer both underages and overages”

Manufacturer - “Most of us manufacturers claim to have reduced theft in our facilities, but have we really? Do we really know the true extent of the losses? Even if theft is falling, don’t misunderstand the pain we experience with process and administrative failures”

Manufacturer – “The ability to move away from holding multiple inventories of sourced [EAS] tagged product at our locations will help us considerably”

Retailer – “EAS works, but tag pollution and lapses in training have drained our staff of confidence. They let most people walk”

Retailer – “The ability to integrate an anti-theft capability with inventory management through smart technology is tremendously exciting. And it wipes out fraudulent returns in one go”



Auto-ID can provide the business “intelligence” to reduce shrink and create value throughout the value chain

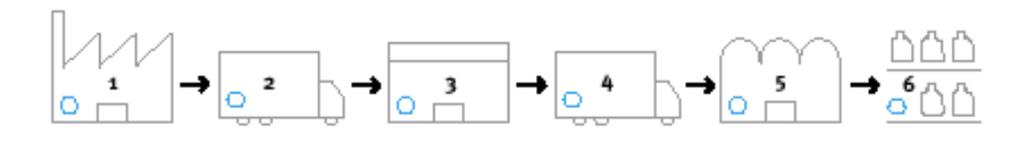
Figure 8:

1. Manufacturer DC
2. Ship to Retail DC
3. Retail DC
4. Ship to Store
5. Store Backroom
6. Store Shelf

Key:

○ Reader

PRODUCT FLOW FROM MANUFACTURER TO STORE SHELF



| | 1 | 2 | 3 | 4 | 5 | 6 |
|--|--|---|---|--|--|---|
| TRADITIONAL SHRINK PROCESS FAILURES | <ul style="list-style-type: none"> - Paper Errors - Burglary - Dated Products | <ul style="list-style-type: none"> - Product Diversion - Fraudulent Invoicing - Phantom Del. - Pricing Errors - Wrong Item Delivery - Over Shipment - Under Shipment | <ul style="list-style-type: none"> - Paper Errors - Pricing Errors - Product Location - Incorrect Inv. Checks - Returns Error | <ul style="list-style-type: none"> - Invoicing Errors - Pricing Errors - Shipping Errors - Phantom Del. - Over Shipment - Under Shipment | <ul style="list-style-type: none"> - Pricing Errors - Receiving Errors - Returns Processing | <ul style="list-style-type: none"> - Pricing Errors - Returns Processing |
| AUTO-ID IMPACTS | <ul style="list-style-type: none"> - Reduction in Paper Errors - Increase Visibility to Code-Dated Items | <ul style="list-style-type: none"> - Monitor Product Movement Through Supply Chain - Improve Invoice Accuracy - Reduce Pricing Errors - Monitor Over/Under Shipments | <ul style="list-style-type: none"> - Reduce Paper Errors - Improve Pricing Accuracy - Improve Picking Accuracy - Improve Labor Efficiency - Reduce Labor Cost - Improve DC Throughput - Improve Returns Accuracy | <ul style="list-style-type: none"> - Reduce Invoice Errors - Reduce Shipping Errors - Reduce Phantom Deliveries - Reduce Over/Under Shipments | <ul style="list-style-type: none"> - Reduce Pricing Errors - Monitor Receiving - Reduce Receiving Errors - Reduce Pricing Errors | <ul style="list-style-type: none"> - Reduce Checkout Price Verification Requests - Improve Returns Processing |



We reviewed, in detail, each shrink pain point experienced by manufacturers and retailers and then analyzed the impact of Auto-ID



| Type of Shrink | Shrink Pain Points | Current Situation | Auto-ID Remedy |
|-----------------------|---------------------------------|--|--|
| External Theft | Shoplifting | <ul style="list-style-type: none"> EAS systems, closed-circuit TVs, etc. Effectiveness reduced over time due to high employee turnover, lack of training | Automatic, accurate proof-of-purchase (or lack thereof) as customer exits store |
| | Fraudulent returns | <ul style="list-style-type: none"> Asking for proof-of-purchase at time of return | Automatic, accurate proof-of-purchase (or lack thereof) at time of return |
| | Burglary | <ul style="list-style-type: none"> Audible or silent security system | Identify location of stolen merchandise to facilitate recovery (after-the-fact solution) |
| Internal Theft | Product theft | <ul style="list-style-type: none"> EAS systems, closed-circuit TVs, etc. Effectiveness reduced over time <ul style="list-style-type: none"> Employees assimilate, learn and develop schemes to circumvent current systems High employee turnover, lack of consistent training | Automatic tracking of product location throughout the value chain – i.e., from the manufacturing facility through POS and exit of store after purchase |
| | Collusion with customers | | |
| | Collusion with vendors | | |

Source: Company interviews, IBM Business Consulting Services analysis



We then analyzed each pain point and potential Auto-ID solution in light of the unique characteristics of each product category

Illustrative

| Type of Shrink | Shrink Pain Points | Product Category | Auto-ID Application | | |
|-----------------------|--------------------|----------------------|---------------------|------|------|
| | | | Pallet | Case | Item |
| External Theft | Shoplifting | Grocery | ✓ | ✓ | |
| | | Apparel | ✓ | ✓ | ✓ |
| | | Consumer Electronics | ✓ | ✓ | ✓ |
| | | Pharmacy | ✓ | ✓ | ✓ |
| | | Music and Video | ✓ | ✓ | ✓ |
| | | Toys | ✓ | ✓ | ✓ |
| | | Health and Beauty | ✓ | ✓ | ✓ |



Characteristics such as item value, seasonality, existing shrink solutions, etc. drove our analysis regarding each product category

Source: IBM Business Consulting Services analysis

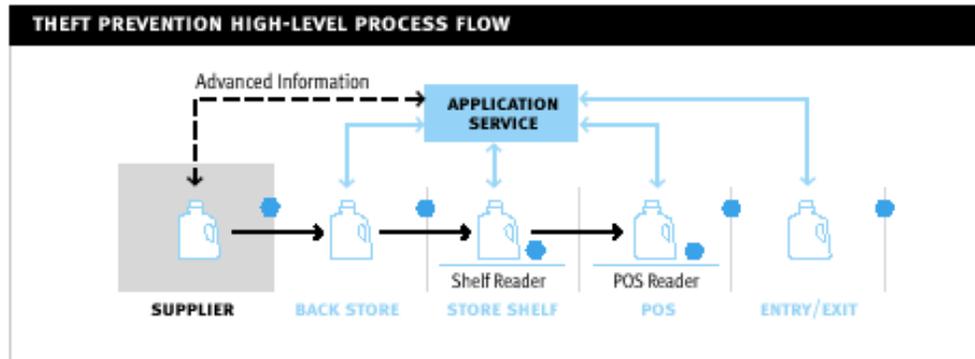


We developed a conceptual implementation solution for each of the five categories of shrink

Figure 10: The theft prevention process flow from supplier through to POS and store exit.

Key:

- Reader
- Supplier
- Store
- Tagged Item
- - - Advanced information sent to customer, includes UPC codes, Tag Ids, Shipment Information, Etc.



| | SUPPLIER | STORE | | | |
|--------------------------------|--|--|--|---|--|
| | | BACK STORE | SHELF | POS | ENTRY/EXIT |
| KEY ACTIVITIES | <ul style="list-style-type: none"> - Supplier tags items - Sends advance notice to customer | <ul style="list-style-type: none"> - Reader reads tags - Verifies receiving accuracy - Updates inventory information | <ul style="list-style-type: none"> - Out-of-Stock Algorithm - Manage perpetual inventory at shelf - Sweep algorithm to manage theft | <ul style="list-style-type: none"> - Updates inventory statuses - Items read via reader in check-out lane - Update to indicate item is legitimately sold | <ul style="list-style-type: none"> - Triggers alarm for items leaving the store without sale |
| TECHNOLOGY REQUIREMENTS | <ul style="list-style-type: none"> - Source Tagging - Advance notification capabilities - Linking UPS codes with unique Tag Ids (e.g. EPC™) | <ul style="list-style-type: none"> - Door Readers - Application logic: <ul style="list-style-type: none"> - Manage perpetual inventory - Track actual vs. expected receipts | <ul style="list-style-type: none"> - Door Readers - Application logic: <ul style="list-style-type: none"> - Manage perpetual inventory - Track actual vs. expected receipts | <ul style="list-style-type: none"> - Short range - Application logic: <ul style="list-style-type: none"> - Perpetual inventory - Link UPS codes to Item Code - Anticipated vs. sold items | <ul style="list-style-type: none"> - Door readers readers - Alarms - Application logic: <ul style="list-style-type: none"> - Unsold item triggers alarm |

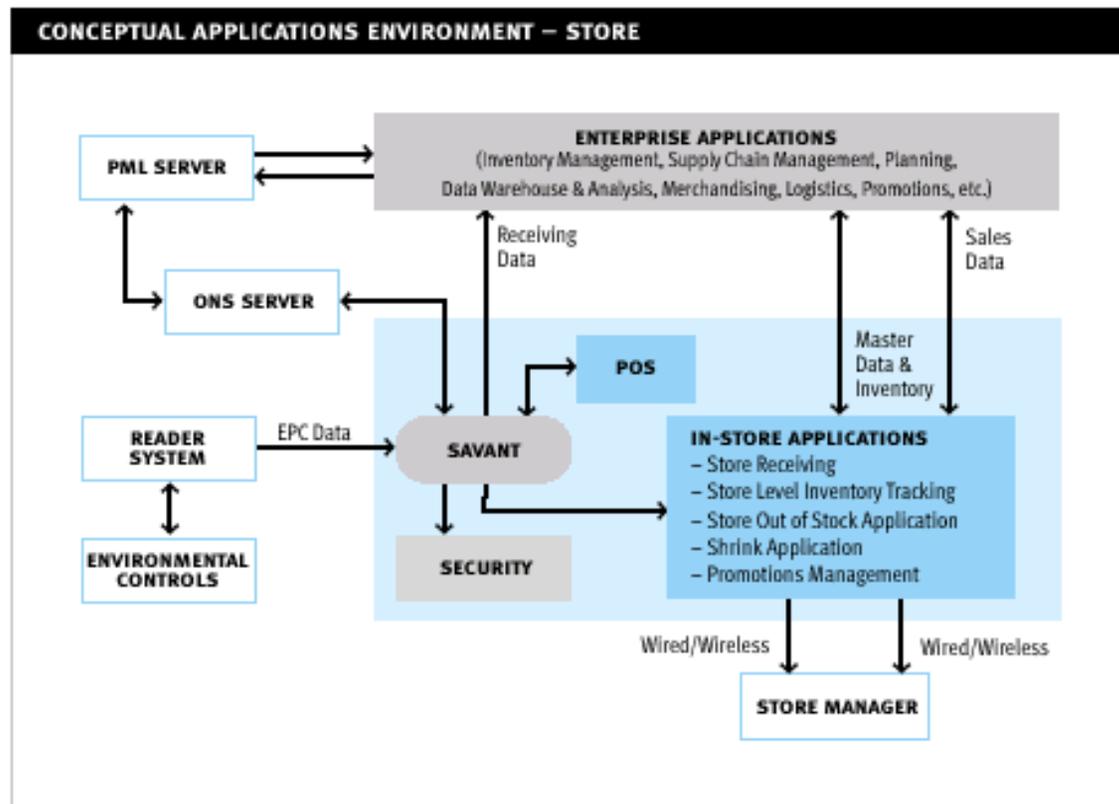
Illustrative

Source: IBM Business Consulting Services analysis



With associated Technology Blueprints

Illustrative



Source: IBM Business Consulting Services analysis



Our research illustrates that Auto-ID can be used to significantly reduce losses from shrink at both the retailer and manufacturer for each of our seven product categories

Table 20: Total Value Chain

| ANTICIPATED BENEFITS AT THE CASE & ITEM LEVEL IN \$000'S | | |
|--|--------------|--------------|
| | CASE-READING | ITEM-READING |
| Grocery | \$90,646 | \$86,556 |
| Apparel | \$100,338 | \$99,379 |
| Consumer Electronics | - | \$50,495 |
| Pharmacy | \$71,846 | \$75,024 |
| Music and Video | \$25,203 | \$24,810 |
| Toys | \$57,189 | \$55,187 |
| Health and Beauty | \$58,156 | \$55,241 |

Table 23: Manufacturer Benefit

| ANTICIPATED BENEFITS AT THE CASE & ITEM LEVEL IN \$000'S | | |
|--|--------------|--------------|
| | CASE-READING | ITEM-READING |
| Grocery | \$30,093 | \$2,074 |
| Apparel | \$33,442 | \$1,827 |
| Consumer Electronics | - | \$9,521 |
| Pharmacy | \$25,558 | \$1,432 |
| Music and Video | \$8,359 | \$468 |
| Toys | \$16,920 | \$948 |
| Health and Beauty | \$17,886 | \$1,002 |

Table 24: Retailer Benefit

| ANTICIPATED BENEFITS AT THE CASE & ITEM LEVEL IN \$000'S | | |
|--|------------------|------------------|
| | CASE-READING | ITEM-READING |
| Grocery | \$60,553 | \$84,482 |
| Apparel | \$66,897 | \$97,552 |
| Consumer Electronics | - | \$40,974 |
| Pharmacy | \$46,288 | \$73,592 |
| Music and Video | \$16,844 | \$24,341 |
| Toys | \$40,270 | \$54,239 |
| Health and Beauty | \$40,270 | \$54,239 |
| TOTAL BENEFIT | \$271,121 | \$429,418 |

Source: IBM Business Consulting Services analysis



There are key challenges specific to Auto-ID that will need to be successfully addressed if the shrink reduction benefits identified are to be realized

- Re-evaluating the role of the loss prevention/asset protection department
- Harnessing the power of real time data with current operations - across functional areas
- Re-aligning resources to take advantage of savings
- Integration of multiple technologies



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Agenda

- Progress to Date and Introduction to our Phase 2 Papers
- Applying Auto-ID to Reduce Losses Associated with Shrink
- Applying Auto-ID to Reduce Losses Associated with Product Obsolescence





Our analysis focused on three key dimensions of product obsolescence in the consumer goods and retail value chain

A definition of Product Obsolescence

“A condition that occurs when an existing product becomes unfit for consumption, or ‘out of date’ as a result of the introduction of a new product or changes in season, consumer taste or fashion”

| Dimension | Description | Cost |
|--------------------------|---|---|
| Perishability | Perishing of foods within and upon reaching their code date | <ul style="list-style-type: none">▪ Mark-downs▪ Write-offs / destruction of product▪ Disposal |
| Seasonality | Reduction in the value of the product due to seasonal changes in demand | |
| New Product Introduction | Reduction in the value of the product due to introduction of either replacement or alternative products | |



In essence, obsolescence occurs at two points in the product lifecycle: when demand is declining or when the product has reached the end of its lifecycle



We looked at how these dimensions typically drive product obsolescence in three retail sectors

| Dimension | Product Category | Impact of Obsolescence |
|---------------------------|----------------------|--|
| Perishability | Grocery | <p><i>“No one wants to buy the last product on the shelf”</i></p> <p>~\$2B lost annually in the U.S. grocery industry on products that are destroyed, returned, placed in salvage or donated to charity</p> |
| Seasonality | Apparel | <p><i>“Markdowns now account for 30% of an apparel retailer’s sales”</i></p> <p>Markdowns result in significant margin reductions, additional carrying costs for excess inventory, and increased labor costs to manage markdown activities</p> |
| New Product Introductions | Consumer Electronics | <p><i>“We’re an industry with 60-day product life cycles and 90-day warranties”</i></p> <p>Poor lifecycle management caused by imperfect product visibility drives unnecessary markdowns and returns – and hinders new product introduction</p> |

Source: 2000 Unsaleables Benchmarking Report, Retail Management Institute, Food Marketing Institute, company interviews, IBM Business Consulting Services analysis



Obsolescence in the current business paradigm is seen as a “cost of doing business”. The lack of visibility to the ‘daily’ causes in all sectors actively inhibits current solutions



Auto-ID can successfully address obsolescence issues in perishables by improving data integrity and supply chain visibility

| Pain Points | Selected Causes | Auto-ID Application | | Benefits - Grocery |
|----------------------|---|---------------------|--------|--|
| Operational Weakness | <ul style="list-style-type: none"> Operational complexity driven by diverse store preparation activity Multiplicity of manual “hand-offs” throughout the supply chain Manual errors in directing flow of product | Pallet Case Item | X X | <ul style="list-style-type: none"> Monitor FIFO compliance at all locations in supply chain Provide real-time visibility to date-coded and temperature sensitive product to improve rotation and product integrity Improve detection and resolution cycles to obsolescence issues |
| Product Damage | <ul style="list-style-type: none"> Inconsistent product handling processes Physical considerations such as quality of packaging materials, etc. | Pallet Case Item | X X | <ul style="list-style-type: none"> Enhanced recording of damage Automates the audit process |
| Ordering Issues | <ul style="list-style-type: none"> Impact of promotions on inventory levels Inflated/unrealistic sales expectations Lack of visibility to supply/demand signals | Pallet Case Item | X X | <ul style="list-style-type: none"> Increased visibility to stock Increased visibility to sales by each location |

The Auto-ID Enabled Supply Chain

- Improved “cold chain” integrity and visibility to product flow issues
- Optimized FIFO management throughout the supply chain
- Creation of a “common” process to monitor and resolve the causes of product

Source: IBM
Business Consulting Services analysis



While not economically justifiable for lower priced perishables, we believe that a strong case exists to use Auto-ID with high value and high ‘impact’ products, such as meat and pharmacy



Auto-ID provides the visibility to help optimise sales in the Apparel industry and therefore reduce markdowns and increase profitability

| Pain Points | Selected Causes | Auto-ID Application | | Benefits - Apparel |
|------------------------|---|------------------------|-------------|---|
| Product Visibility | <ul style="list-style-type: none"> Poor visibility of inter-store transfers Poor visibility to total in-store inventory | Pallet Case Item | X X X | <ul style="list-style-type: none"> Improve inventory accuracy Improve perpetual inventory process Improve in-store replenishment process |
| Lifecycle Management | <ul style="list-style-type: none"> Inaccurate product lifecycle performance reporting weakens forecasting/allocation | Pallet Case Item | X X | <ul style="list-style-type: none"> Improve product performance Reduce backroom inventory Better allocation of product |
| Supply Chain Tradeoffs | <ul style="list-style-type: none"> Safety stock created to support lead-time from design through to store display | Pallet Case Item | X X | <ul style="list-style-type: none"> Create view to total seasonal ownership across channels Reduce safety stock levels |

The Auto-ID Enabled Supply Chain

- Improve product lifecycle management
- Improve price and markdown planning and execution
- Reduced levels of stock to support demand

Source: IBM
Business
Consulting
Services
analysis



While Auto-ID will enable greater sophistication of product lifecycle management for the Apparel industry there are still significant benefits to be achieved in the short term through better forecasting, allocation, and markdown optimization capabilities



Auto-ID can help the consumer electronics industry to improve the management of the entire product lifecycle

| Pain Points | Selected Causes | Auto-ID Application | | Benefits – Consumer Electronics |
|-------------------------------|---|------------------------|-------------|--|
| The “Newest Version” Syndrome | <ul style="list-style-type: none"> High rate of new product introductions | Pallet Case Item | X X X | <ul style="list-style-type: none"> Enable better product lifecycle management through increased inventory visibility Improve timeliness of shelf replenishment from back room Prioritize handling of store receipts |
| Reverse Logistics | <ul style="list-style-type: none"> “Initial push to stimulate demand creating excess inventory Complexity of in-store operations required to handle returns | Pallet Case Item | X X | <ul style="list-style-type: none"> Increase visibility to returned items Improve accuracy to actual units to be returned or located for processing |
| Lack of SKU Visibility | <ul style="list-style-type: none"> Visibility of “eaches” within totes Lack of store-level inventory tracking as it changes location and status | Pallet Case Item | X X | <ul style="list-style-type: none"> Increase inventory visibility within transit and storage units (totes) Improve tracking capabilities for better forecasting of future demand |

The Auto-ID Enabled Supply Chain

- Improved new product introduction
- Improved purging of old or “dated” products from channels
- Effective markdown execution

Source: IBM Business Consulting Services analysis

Accurate and timely visibility to high value, store level inventory, will represent a step change in operational capabilities



The Auto-ID Blueprint for the DC focused on enabling product rotation and temperature monitoring

Figure 7:
Auto-ID technology in the DC will optimize the handling of code-dated products

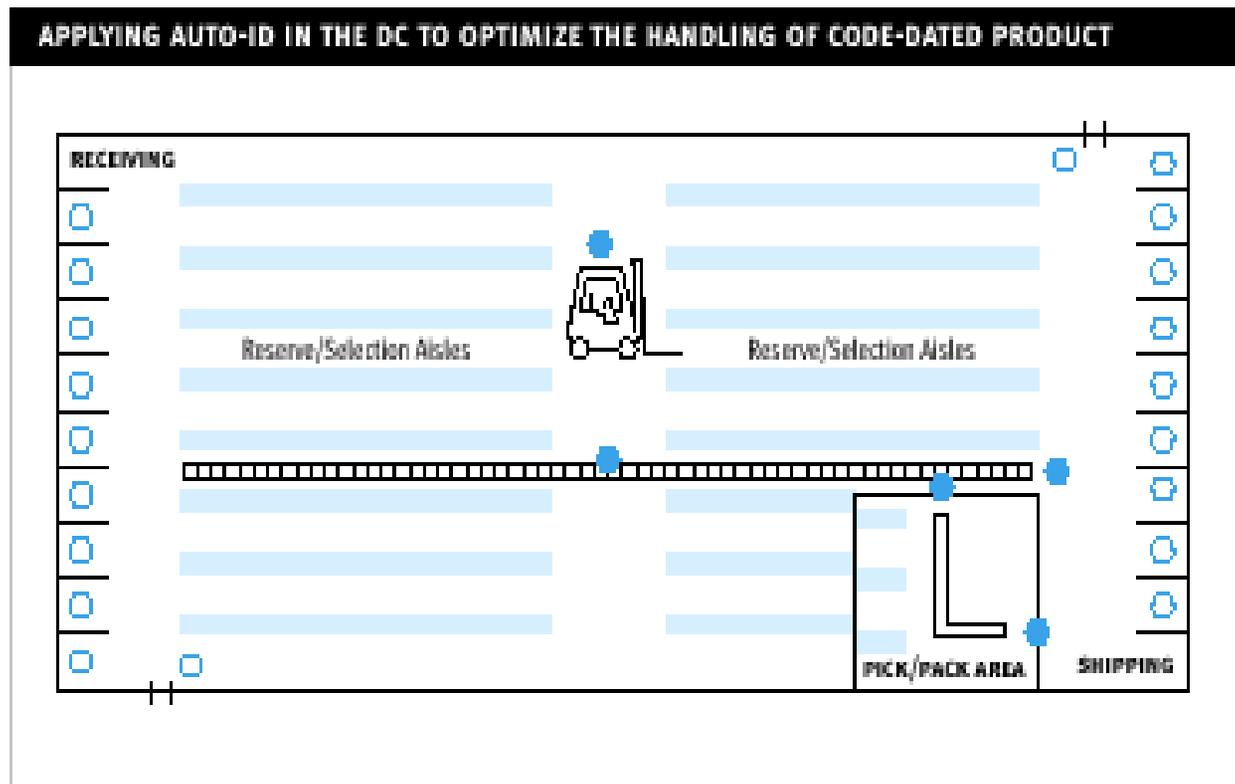
Key:

- Exterior Door Reader
- Pick/Pack Reader

**EXTERIOR DOOR READER
(RECEIVING & SHIPPING)**

How it works...

- Reads item and associates tag with product age or promotion characteristics
- Database queries run oldest product first, or alternatively SKU promotional codes that must be cleared first
- Benefit**
- FIFO control
- Result**
- Identification of expired/soon to be expired product
- Enables materials handlers to reject or to segregate product as per handling procedures

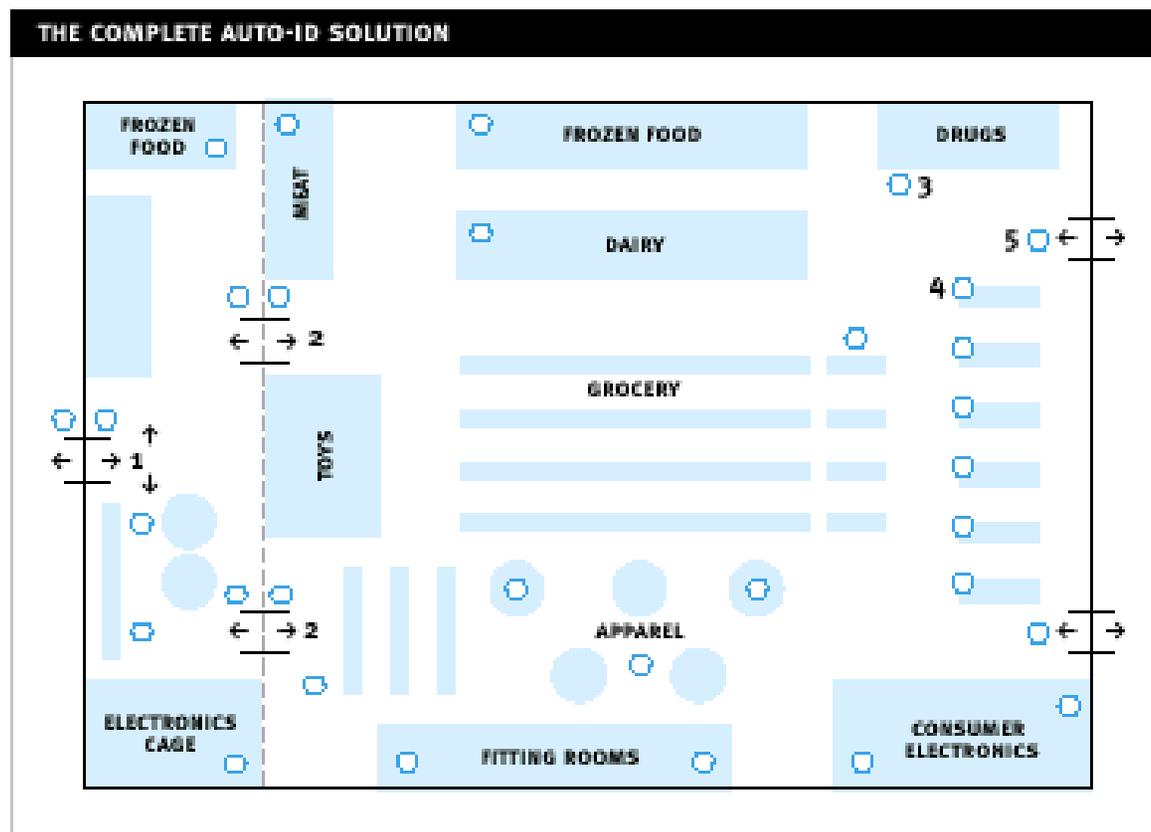




The store level Auto-ID “footprint” is largely the same for Product Obsolescence and Shrink management

Figure 5:

1. RFID Readers at the back door read pallet, case, and item level information as products are moved through receiving door.
2. Readers track movement of cases and items between back room and sales floor. Alerts can be triggered if item movements to the sales floor are not compliant with FIFO inventory disciplines.
3. Readers on the sales floor are capable of reading item tags to track product availability on the sales floor and to quickly locate items that may be out of place.
4. Readers at the check-out counter track when item is sold. POS readers may also deactivate tags.
5. Readers at the front door track items as they leave the store.





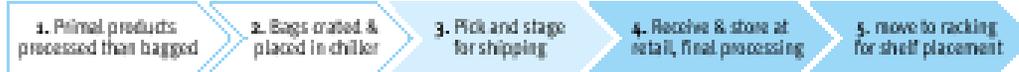
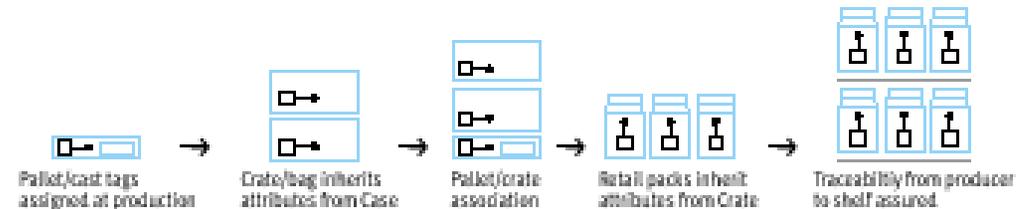
We have further developed the Auto-ID blueprint to support reductions in Product Obsolescence occurring in temperature controlled environments

Grocery "Cold Chain" Example

Figure 6:
Auto-ID technology will help reduce obsolescence by tracking temperatures and the time intervals

- Key:
- Packing
 - Packing & DC
 - Retail Store

SAMPLE APPLICATION OF AUTO-ID TO MANAGE COLD-CHAIN PRODUCTS



- Read pallet/case tags as removed from chiller
- Associate "side" to product on conveyor
- After processing product bagged and tagged
- Read crate/item tag as enters chiller
- **Interval to cold storage**
- **Read pallet/case tags as product leaves processing**
- **Then again as enters chiller**
- **Elapsed time and environmental temperature are key QA metrics**
- Read pallet/case tags
- WMS confirms product, customer, truck, load, sequence
- Pick/stage interval & temperature are read
- Receive, chill, pick, stage, ship for retail DC
- Receiving interval & temperature read
- As re-cut, attributes of product are passed to Retail Packs
- **Crates become retail items**
- **Crate tags read as product enters processing**
- **Attributes of bagged product are passed**
- Reads item tags for perpetual inventory
- Notify clerks if product carried to sales floor is not in FIFO order
- POS Barcode could be used for traceability to shelf as interim solution

Source: IBM Business Consulting Services analysis



the deployment of Auto-ID to address Product Obsolescence “pain points” can provide additional benefits for the seven product categories reviewed

| ANTICIPATED BENEFITS AT THE CASE & ITEM LEVEL IN \$000'S | | |
|--|--------------|--------------|
| | CASE-READING | ITEM-READING |
| Grocery | \$34,580 | \$77,012 |
| Apparel | \$4,186 | \$9,766 |
| Consumer Electronics | - | \$16,325 |
| Pharmacy | \$6,998 | \$16,328 |
| Music and Video | \$2,512 | \$5,861 |
| Toys | \$4,647 | \$10,843 |
| Health and Beauty | \$7,358 | \$17,169 |

| ANTICIPATED BENEFITS AT THE CASE & ITEM LEVEL IN \$000'S | | |
|--|--------------|--------------|
| MANUFACTURER | CASE-READING | ITEM-READING |
| Grocery | \$5,986 | \$10,294 |
| Apparel | \$2,241 | \$5,230 |
| Consumer Electronics | - | \$7,459 |

| ANTICIPATED BENEFITS AT THE CASE & ITEM LEVEL IN \$000'S | | |
|--|--------------|--------------|
| RETAILER | CASE-READING | ITEM-READING |
| Grocery | \$ 28,594 | \$ 66,718 |
| Apparel | \$ 1,944 | \$ 4,537 |
| Consumer Electronics | - | \$ 8,866 |
| Pharmacy | \$ 3,757 | \$ 8,766 |
| Music and Video | \$ 2,512 | \$ 5,861 |
| Toys | \$ 4,647 | \$ 10,843 |
| Health and Beauty | \$ 4,658 | \$ 10,869 |



There are key challenges specific to Auto-ID that will need to be successfully addressed if the benefits associated with product obsolescence are to be realized

- Adapting to a real time data environment
- Building simplicity into existing operations
- Taking advantage of the sales opportunity



The opportunity to address product obsolescence issues will not be sufficient to drive the adoption of Auto-ID. Rather it will represent a 'second phase' of application once value chain partners become comfortable with the capabilities and business challenges of the technology



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