



IBM BUSINESS CONSULTING SERVICES

Applying Auto-ID to Reduce Losses Associated with Product Obsolescence

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ABSTRACT

Imagine an environment where your product is on the store shelf each and every time consumers reach for it. Imagine an environment where perishables don't perish, where theft is fully detectable, where your systems exactly match physical inventory counts, and where transfers with trading partners are automated and precise. Imagine product visibility, transparency and a supply chain built on real time demand and supply information – imagine the impact on your inventory and working capital. Image the impact of the barcode some 25 years ago. Now imagine the impact of Auto-ID.

Auto-ID represents a truly transformational technology with the ability to revolutionize the face of the supply chain, retail operations and consumer-facing processes. It has the potential to drive enormous shareholder return benefits across a breadth of key metrics including revenue growth, operating margin, working capital and capital expenditures. Just imagine the possibilities...

IBM Business Consulting Services, in conjunction with the Auto-ID Center, has worked with over 25 leading players in the consumer goods and retail sectors to develop a series of white papers around this exciting and emerging technology. Our research is based on current leading practices, making the value proposition all the more compelling. IBM Business Consulting Services has now published four Auto-ID White papers.

June 2002

- Applying Auto-ID within the Distribution Center; and
- Applying Auto-ID to Improve Availability at the Retail Shelf.

November 2002

- Applying Auto-ID to Reduce Losses Associated with Shrink; and
- Applying Auto-ID to Reduce Losses Associated with Product Obsolescence.

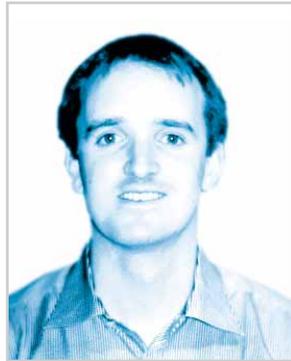
We encourage you to read our Auto-ID Prelude prior to diving into our series of white papers. The Prelude provides a compelling business case discussion for the adoption of the Auto-ID system across the consumer goods and retail value chain. The Prelude addresses important issues around adoption and migration paths. The individual white papers illustrate the impact of the Auto-ID system on specific pain points faced by companies today. We are confident that you will be excited about this development and urge you to consider the transformational opportunities of Auto-ID in your own organization, as well as with your trading partners.

IBM Business Consulting Services (www.ibm.com/services) is one of the world's leading providers of management consulting and technology services to many of the largest and most successful organizations, across a wide range of industries. With offices in 160 countries, IBM Business Consulting Services helps clients solve their business issues, exploiting world-class technology for improved business performance.

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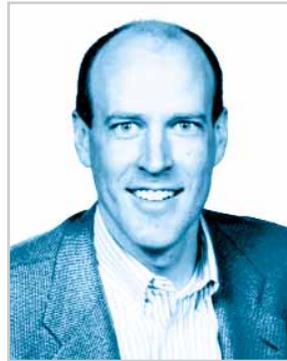
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Biographies



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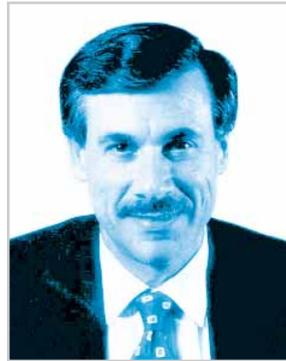
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Chris Sheedy, Consultant, IBM Business Consulting Services has over 12 years of experience focusing primarily on the application of technology to improve business processes. Chris has worked primarily with clients in the consumer packaged goods and high tech industries. Chris received a B.S. in Business Logistics from Penn State University and an MBA in Management & Strategy and Information Management from The Kellogg School of Management at Northwestern University.

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AUTO-ID PRELUDE

Auto-ID: Raising the Bar (code)

Sell one, replenish one, sell one, replenish one...

Or better yet, sell one, make one. That is the ideal value chain vision: synchronize activities across the chain from point-of-purchase all the way back through raw material delivery and, in doing so, achieve a perfect demand driven and networked economy.

How can we achieve this vision? It starts with synchronizing trading partner operations, aligning goals and demand signals, and creating a truly intelligent value chain where information visibility is achieved through common accepted standards.

Enter Auto-ID: a collaborative effort, driven by some of the world's leading consumer goods and retail companies, academic institutions, systems integrators and technology hardware providers, to create a unified product identification and tracking system that will benefit and, indeed, transform the entire value chain just as the Universal Product Code (UPC) bar code did 25 years ago.

The vision provides consumer goods and retail companies with the opportunity to transform their supply chain and consumer facing activities and, in so doing, reach the next level of commercial performance and shareholder value.

The vision is clear. But questions remain, including "How will Auto-ID enable the components of this vision? ... What form will it take? ... What is the value proposition? ... When might this happen?"

IBM Business Consulting Services has been working closely with the Auto-ID Center to study what the adoption of Auto-ID technology will look like. Based on our analysis, we believe that the adoption of Auto-ID is close at hand and that the business case behind it is exciting and compelling. Our findings and recommendations are based on extensive research including interviews and workshops with more than 25 major industry participants.

In the course of our research, IBM Business Consulting Services has driven the business case for commercial adoption of Auto-ID to a new level by analyzing value-chain-wide costs and benefits at the pallet-level, case-level and item-level. Our "base case" research is based on the Auto-ID Center's current tag cost assumptions, and a fully compliant network using the Auto-ID Center's recommendations around the Electronic Product Code (EPC)[™], Object Naming Service (ONS) and Physical Mark-up Language (PML). Our analysis articulates how adoption curves differ significantly by product categories, and that the business case for low priced items, such as a can of soup, is very different than that of higher priced items, such as consumer electronics.

IBM Business Consulting Services generic value chain model includes seven product categories: **1. Apparel; 2. Grocery; 3. Consumer Electronics; 4. Health & Beauty; 5. Music & Video; 6. Pharmacy; and 7. Toys.** Items are then sold through a supercenter retailer.

Our price points within these seven product categories carry the range from \$1.75 for the average grocery shopping basket item, to \$130.00 for the average consumer electronics item. Our strategic conclusion from this analysis is clear:

[IBM Business Consulting Services business case analysis suggests a compelling near term business case for pallet and case-level adoption for most product categories, and item level adoption for higher value product categories.](#)

Moreover, our analysis is based on research that included work sessions with a large number of the world's leading manufacturing and retail companies for the different product categories. In this context, a compelling value proposition is all the more credible.

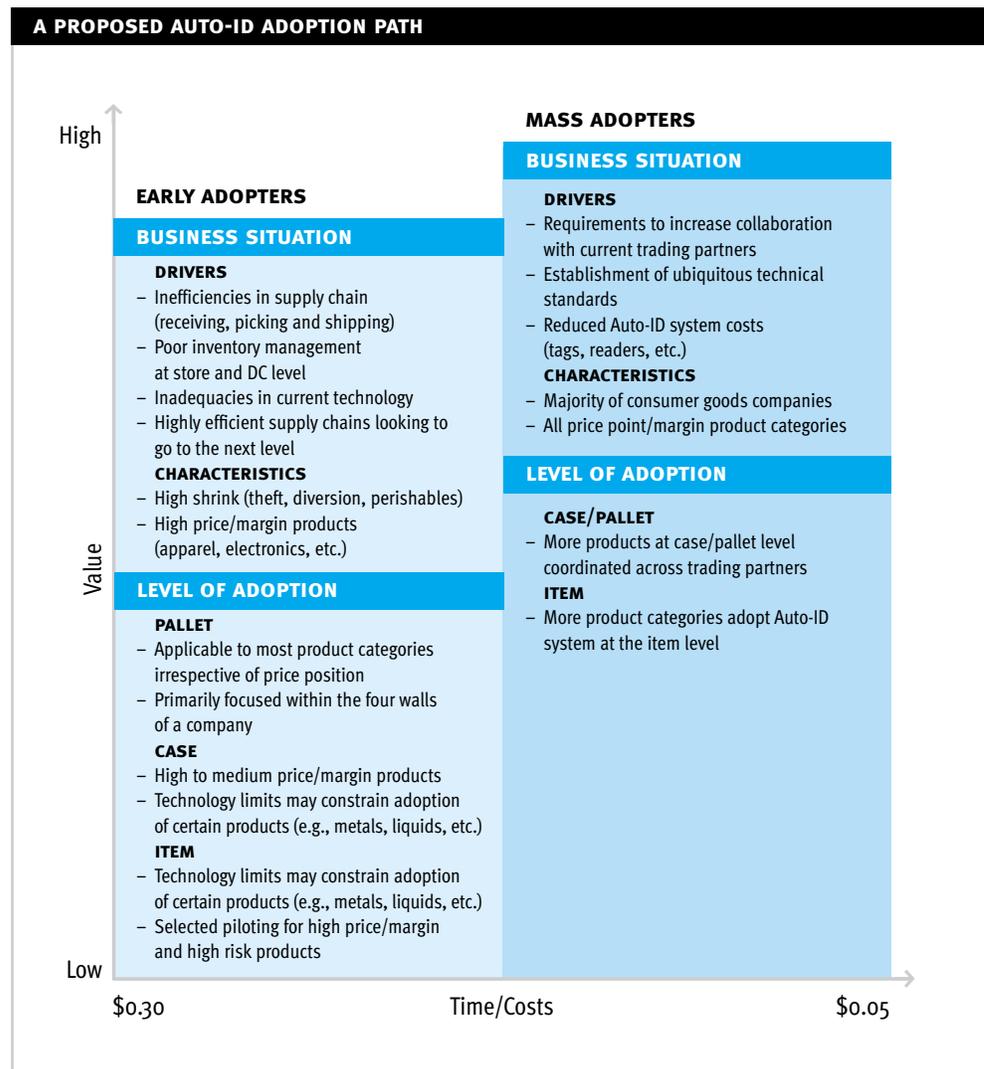
In the subsequent sections of the Auto-ID Prelude, we will introduce:

- IBM Business Consulting Services proposed adoption path for Auto-ID technology
- The Business Case for Auto-ID
- The IBM Business Consulting Services Auto-ID White Paper Series

The Auto-ID Adoption Path

Tag costs constitute the majority of the Auto-ID system implementation costs, and therefore are the dominant variable when reviewing business cases for adoption. Price points, product characteristics, current business performance, current infrastructure and physical attributes of products all are contributing factors to determining the time and scope of adoption. See Figure 1.

Figure 1

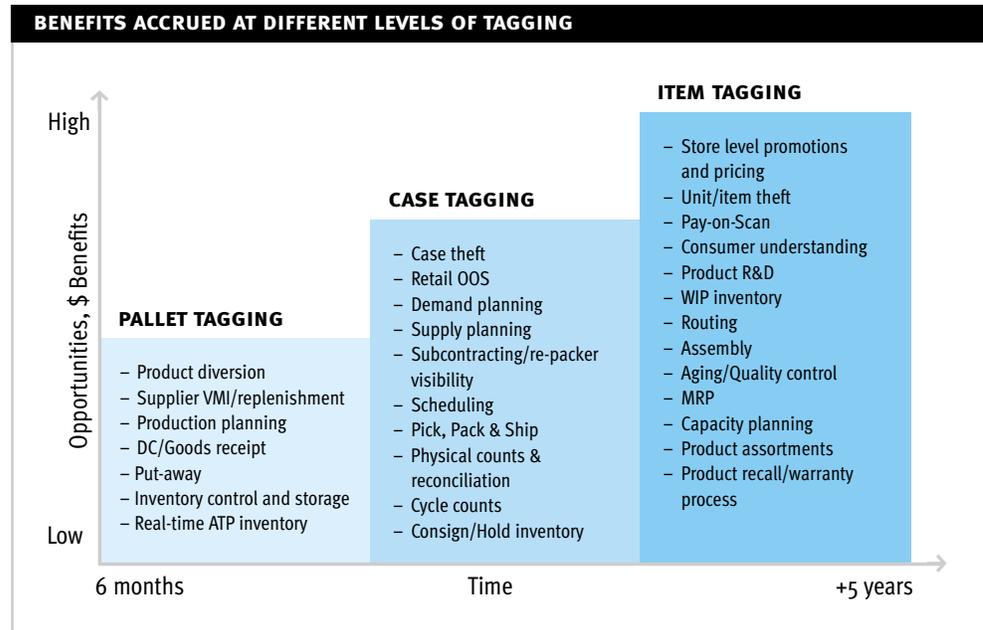


We have identified key company drivers and characteristics that lend themselves to various adoption strategies. In general, early adopters will tend to be those that can improve supply chain efficiency and inventory management by implementing Auto-ID at the pallet and case level within the four walls of their organization. Mass adoption will be driven by reducing tag costs, adoption of ubiquitous technology standards, and by an environment that fosters collaboration and information sharing.

For some companies, existing supply chain inefficiencies may lead to early item-level adoption by piloting certain high-margin and high-risk products. On the other hand, some companies will wait for the establishment of a ubiquitous technical standard and lower technology costs before choosing to adopt the Auto-ID system.

The benefits of the Auto-ID system will increase significantly as companies transition from pallet, to case, to item-level tagging, and increase the degree of collaboration and sharing with trading partners. Figure 2 introduces the associated opportunities and relative benefits realized across the value chain by moving towards a more granular level of tagging.

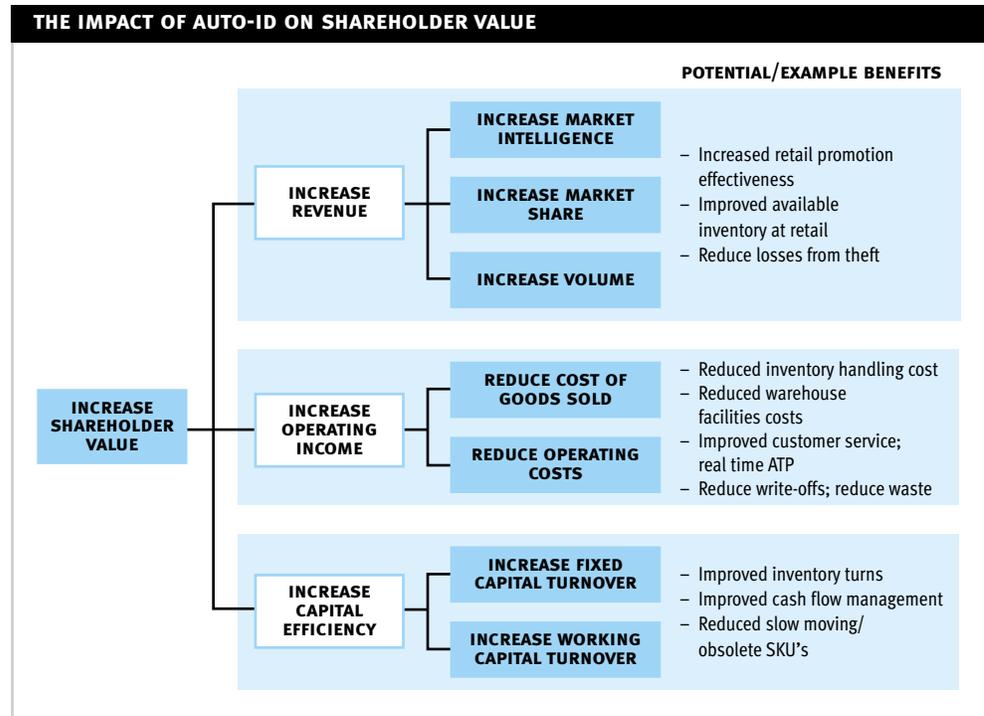
Figure 2



The Business Case for Auto-ID

The Auto-ID system is transformational to industries and key participants and can drive people, process and technological improvements that will positively impact overall shareholder value. The Auto-ID system can have tangible impacts on key shareholder value levers as shown in Figure 3.

Figure 3



In developing our business case for the Auto-ID system, we have utilized a four-phased framework. This framework leverages our experiences in developing emerging technology business cases for clients in the consumer goods and retail industries. The Four-Phased Framework is as follows:

Phase 1: Define Objectives

Overall objectives for Auto-ID were defined and categorized. During this phase, we identified the existing “pain points” in the value chain and their impact on both financial and non-financial measures.

Phase 2: Develop Preliminary Model

In order to develop a point of view around the feasibility of an Auto-ID business case, a hypothetical manufacturer-retailer system was set up to reflect the various flows of products in the different categories from manufacturer through to the consumer (at point of sale). Industry benchmarks, IBM Business Consulting Services surveys such as the Industry Week-Census of Manufacturers Survey, interviews with participant companies, IBM Business Consulting Services experience and insight, and other published information were used to arrive at the characteristics of the hypothetical system, which included manufacturer plants, manufacturer DC's, retailer DC's and retailer stores.

This type of system allowed us to identify and quantify the impact of various Auto-ID benefit areas and to understand the impact of Auto-ID on the system as a whole for the different product categories. At the same time, this analysis methodology allowed us to protect individual data provided by participant companies. Our model does not represent any particular company or companies. Instead, it represents scenarios that most readers will find relevant, to some degree, to their business.

Phase 3: Validate Assumptions

After the system was set up, possible benefit areas were identified and quantified through research. Where quantification was not possible, benefits were categorized as intangible benefits. We expect that these intangible benefits make the case for Auto-ID even more compelling.

The cost assumptions were derived from data provided by the Auto-ID Center. The majority of the costs are associated with the variable cost of the tags, while reader systems contribute to a high percentage of the fixed cost. The Auto-ID costs were developed based on conversations with numerous technology providers coupled with assumptions regarding the degree of adoption. It is assumed that if the adoption curve shifts significantly there will be a corresponding change in the cost estimates.

Phase 4: Develop Business Case

Based on the costs and benefits identified, Net Present Values (NPV's) were calculated to examine the feasibility of Auto-ID. Because Auto-ID is a new technology, the NPV was calculated out only on a seven-year period (rather than a longer period) and no perpetual value number was assumed. A discount rate of 12% was used. In calculating the NPV at the case level, an accrual of benefits was assumed at an increasing rate, with only 50% of the benefits being assumed in Year 1, 75% in Year 2, and 100% from Year 3 onwards. At the item level, the rate of assumption of benefits was 25% in Year 1, 50% in Year 2, 75% in Year 3 and 100% from Year 4 onwards. Similarly, one-time implementation costs were split up, with 70% of the costs being allocated in Year 1 and 30% in Year 2.

Table 1

LEVEL OF TAGGING	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7
PALLET	50%	75%	100%	100%	100%	100%	100%
CASE	50%	75%	100%	100%	100%	100%	100%
ITEM	25%	50%	75%	100%	100%	100%	100%

The IBM Business Consulting Services White Paper series does not constitute an Auto-ID business case for any one company. Benefits and costs are presented at the “system level”, i.e., the value chain level. We conducted our analysis for generalized consumer products value chain systems with the following broad characteristics:

Table 2: Value Chain System Characteristics By Product Category

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

	1	2	3	4	5	6	7
ITEMS	8,000MM	667MM	65MM	726MM	259MM	312MM	363MM
MFG PLANTS	4	3	3	3	4	4	4
MFG DCS	10	4	3	5	4	5	4
RETAIL DCS	4	25	25	25	25	25	25
RETAIL STORES	800	800	800	800	800	800	800
AVG PRICE	\$1.75	\$14.00	\$130.00	\$9.00	\$18.00	\$26.91	\$18.00

¹ Please see IBM Business Consulting Services, Auto-ID White, Papers, June 2002.

Our original value chain for grocery¹ was used to create other value chains for six additional product categories. Grocery sales on a retail level were compared to sales for those other product categories. From those sales levels and average price points we determined number of items manufactured and sold in the value chains. Additionally, we used those sales levels to determine the number of plants and distribution centres in each particular value chain.

The split of sales in our retail store (carrying all seven product categories) is shown in Table 3.

Table 3

SALES BREAKDOWN IN A LARGE SUPERCENTER	
Grocery	24.2%
Apparel	16.1%
Consumer Electronics	14.5%
Health & Beauty	11.3%
Music & Video	8.1%
Pharmacy	14.5%
Toys	11.3%
TOTAL	100.0%

While there are applications and considerations for suppliers to manufacturers, the focus of our first four papers is on trading relationships between manufacturers and retailers.

Based on the above value chain, our analysis indicates compelling propositions across all seven product categories for case-level tagging. For all the product categories, with exception for grocery, our analysis show compelling propositions for item-level tagging as well. See Table 4.

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

The Base Case assumptions refer to the Auto-ID Center's tag cost estimates (30 cents in 2003, 20 cents in 2004, 10 cents in 2005, and 5 cents thereafter). Our Best Case analysis follows more aggressive tag cost estimates as quoted by industry players for large volume users (7.5 cents in 2003, 5 cents in 2004 and 2 cents thereafter).

The numbers above (in \$MM) are a result of NPV analyses across separate product categories, aggregating all benefits and costs, over a 7-year period. We have assumed that pallet and case level adoption occur in 2003 for all product categories, while item-level adoption occurs in 2004 for all product categories except for grocery (adoption starts in 2005).

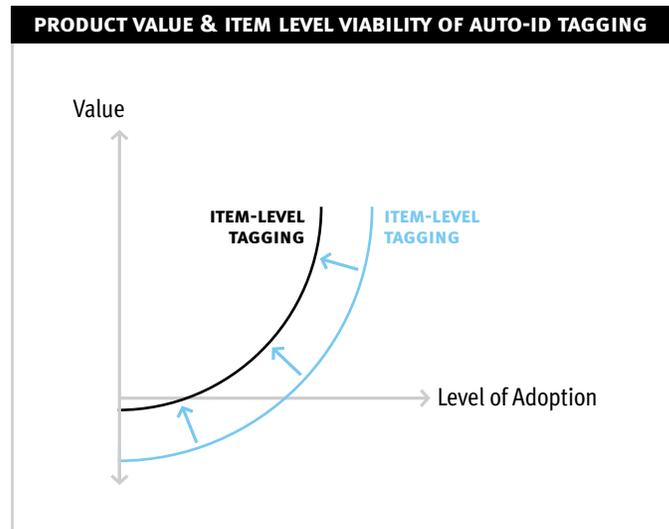
The business propositions for item-level, case-level, and pallet-level tagging varies across the product categories. For example, our analysis shows that item-level tagging is more applicable to higher value/high margin goods. On the other hand, given the tag-price assumptions in the above scenarios, at 30 cents a tag in 2003 (Auto-ID Center base case assumptions), it is not surprising that item-level tagging is not viable for our "generalized" grocery supply chain with an average retail price of \$1.75.

However, that does not preclude the consideration of item-level tagging items that are of higher value to the participants in the grocery supply chain, such as high-price products, high-risk categories, and promotional categories. As the tag costs drop, so the range of consumer goods that would have a positive return at item-level tagging, will widen. Tag prices will depend on the level of adoption and advancements made in tag-manufacturing and labelling technology.

The story changes for higher price/higher margin products such as electronics, apparel and expensive consumer durables. For these product categories, not only does case-level tagging become even more compelling, but a business case for item-level tagging becomes viable – even at current tag price points. See Figure 4 below.

Figure 4:

Key:
— Low Price/Low Margin
— Higher Price/Higher Margin



The Auto-ID Prelude provides an overview of the impact of the Auto-ID system on the consumer goods and retail value chains. IBM Business Consulting Services is further collaborating with the Auto-ID Center to develop a series of white papers that explore the business opportunities that Auto-ID presents in addressing tangible pain points within the consumer goods and retail value chains. The first four papers in this series are:

June 2002

- Focus on Retail: Improving Product Availability on the Retail Shelf; and
- Focus on the Supply Chain: Applying Auto-ID within the Distribution Center.

November 2002

- Applying Auto-ID to Reduce Losses Associated with Product Obsolescence
- Applying Auto-ID to Managing Shrink from Manufacturing to Point of Sale

Assumptions in developing the business case and the NPV analysis

In developing these white papers, IBM Business Consulting Services makes a number of generalized assumptions about Auto-ID technology adoption and implementation:

- High adoption rates will reduce tag and reader prices over the next decade. Our cost models have been developed using Auto-ID cost estimates for tags and readers outlined in the table below. Changes in the estimates below can have a significant impact to the business case. To that point, we have supplemented base case analysis with “best case” tag cost assumptions in addition to what you see in Table 5 below. These more aggressive assumptions are based on tag costs of 7.5 cents in 2003, 5 cents in 2004 and 2 cents thereafter.

Table 5

	2002	2003	2004	2005	2006
Industry tag sales (millions of units)	200	300	700	3,000	15,000
Tag price to highest volume users	0.40	0.30	0.20	0.10	0.05
Industry reader sales (million units)	0.1	0.2	0.5	1	2
Reader electronics price to volume users	\$500	\$250	\$150	\$100	\$70

- The papers have been developed with a view towards implementing an Auto-ID compliant system including utilization of EPC™, ONS and PML standards. The case will vary considerably for the implementation of proprietary RFID technology.
- The papers have assumed that the technology will work as envisioned by the Auto-ID Center and will provide the accuracy rates and the reliability necessary for wide spread adoption.
 - Standards such as EPC™, ONS and PML will be developed and adopted
 - Compatibility among different technology components will be achieved, including the ability to support multiple tag and reader formats and frequencies.
 - Technology will be operated and adopted globally
- Our business case analysis including the NPV analysis in Table 1, specifically applies to the hypothetical supply chain system illustrated in Figure 1 and includes the following assumptions:
 - 100% tagging compliance across the system for each level of adoption
 - The cost components incorporated in the analysis include tag costs, reader systems cost, infrastructure costs, basic application integration costs, maintenance and support costs and overhead costs
 - The benefits and the tag costs have been applied on a system-wide basis
 - i.e., value-chain wide.
 - The benefits have been quantified assuming system-wide adoption and open data/information sharing.

ACKNOWLEDGEMENT

IBM Business Consulting Services would like to thank the Auto-ID Center and the many companies that contributed to this paper. In particular, we would like to extend special thanks to the following companies whose involvement and insight was instrumental in helping us to shape our point of view.

End User Participants

A&P, Blockbuster, Circuit City, Coca-Cola, CVS/Pharmacy, Federated Department Stores, Gillette, Home Depot, Imperial Tobacco, Intel, JC Penney, Johnson & Johnson, Kroger, Limitedbrands, Molson, Philips Semiconductors, Procter & Gamble, Staples, Target, Unilever, Wal*Mart

Technology Vendor Participants

The following vendors have provided IBM Business Consulting Services with technology insights over the past months that have contributed to our paper: Alien Technologies, Checkpoint Systems, Display Edge, Escort Memory Systems, Intel, Intermec, Matrics, Philips Semiconductors, RAFSEC, RF Saw, SAP, Sensormatic, Sun Microsystems, Symbol, and ThingMagic.

We would like to point out that all proprietary information produced through conversations, workshops and data gathering with participant companies remains confidential to those companies and IBM Business Consulting Services. IBM Business Consulting Services has used these insights only to verify our own knowledge or publicly available information. In a small number of cases, data was blinded and ranged to prohibit the reader from linking any specific data to any specific participant. Figures quoted in this paper therefore refer to:

- IBM Business Consulting Services own consumer goods and retail knowledge experience including benchmarking studies and engagements with a wide range of clients over a number of years;
- Publicly available information sources; or
- The hypothetical value chain model we created to articulate the costs and benefits of implementing an Auto-ID solution.

1. INTRODUCTION – THE CHALLENGE

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.”

To the consumer goods manufacturer and retailer it can be put more simply: Product Obsolescence is a source of significant loss to the bottom line. It has come to be accepted as a “cost of doing business,” and as such is factored into the selling price of the product. The costs of product obsolescence are embedded into every stage of supply chain with everyone straining to see what’s in their own bucket. As one industry player put it, “the spotlight very quickly gets dimmer when you move it up and down the supply chain.”

Looked at another way, obsolescence occurs at two points in the product lifecycle:

- When demand is declining, which results in the selling value being reduced; and
- When the product has reached the end of its lifecycle and become unsaleable to the public.

1.1. The Impact to the Value Chain

The reality is that product obsolescence affects all participants in the value chain, not just the retailer. From the raw material supplier whose growing or production cycle is in advance of demand; to the manufacturer who juggles the inventory levels of numerous raw materials, work in progress, and finished goods; to the third party distribution provider who seeks to optimize vehicle loads from many manufacturers; to the retailer where the clock starts ticking on selling the finished product.

Participants see their own issues (and not necessarily the others) – and the negative outcomes are products’ saleability expiring on the shelf, or on the way to the shelf, which then have to be accounted for and disposed of, often with regulatory or legal caveats. Even when the product gets to the shelf, visibility centrally and locally may have ‘fractured’ to the extent that the product is eventually subject to excessive markdowns and write-offs as the decision is taken to clear it from the business to make way for new products.

These issues center on a fundamental inability to see the whole problem; where participants understand some of the causes but not all, and as a consequence ‘solutions’ tend to address situational ‘effects’ rather than ‘causes’.

However this is in part understandable given that each location in the supply chain can have a multitude of contributors to obsolescence losses. Taking the retail store as a location, both internal and external factors such as competitor promotions, changing weather conditions, or simply a lack of staff to manage daily issues, will drive obsolescence in ways that it is hard for other locations in the supply chain to see or take account of.

As a result, in the US alone, billions of dollars are lost across the supply chain due to failures of lifecycle management.

Often compounding the problem is the fact that current industry, business, or individual unit accounting methods – for example, the retail method for inventory management, different ways of accounting for paper shrink or store transfers, the accuracy and auditing of cycle and markdown counts – often make the **scale** of the problem hard to see.

1.2. Prevailing Culture often Sustains Product Obsolescence

- **“Grocers are gamblers, we put things out in a bold display and hope that the product sells”**
There will always be a trade-off between ‘shelf presentation’ and sales potential which will result in product obsolescence as grocers still tend to prioritize shelf availability, irrespective of trading levels.
- In bookselling, bold displays of new ‘best-selling’ titles are used to stimulate demand, in the knowledge that unsold copies can be returned to the publisher to be pulped, or recycled at lower values.

2. SUMMARY OF KEY FINDINGS

Despite the promise of Auto-ID based solutions, we aim in this paper to take a pragmatic and realistic view of adoption and seek to determine the realistic impact implementations can have across different product categories. To this end we have broadened our research to include manufacturers of different products, supplying to a multi-category retailer.

The core findings support the strategic conclusions from our earlier white papers, namely that the costs of deployment of an Auto-ID solution, in this case to address product obsolescence, are likely to be prohibitive to all but a minority of product categories in the short term at the **item level**.

However, while costs of deployment at the **pallet and case level** are lower, the benefits across any product category do not appear to be sufficient to justify investment for this application alone.

Of the three primary product categories we investigated – grocery, apparel, and consumer electronics – the benefits case was strongest in high value/highly perishable products such as meat or pharmacy, and in consumer electronics, where the pressure to constantly recycle ‘new’ products creates enormous pressure on ‘store by store’ level management of the product lifecycle.

As stated in the introduction, obsolescence is embedded in the product lifecycle itself, and therefore any deployment of Auto-ID technology to address the issue is likely to face more complex implementation challenges than would, for example, applications to support; shrink management, product availability, or supply chain visibility.

Our findings also suggest that the organization and cultural barriers to change on this issue are significant, and would more effectively be addressed once Auto-ID technology has been extensively incorporated into the value chain.

In many ways, when you consider Auto-ID’s real-time product tracking capability within the context of product obsolescence, the metaphor of the Formula One racing car becomes particularly valid. The race car as a product is uniquely configured to report performance throughout a single journey – it has a unique life-cycle, enabling the race team [manufacturer and retailer] to make adjustments to speed, grip and fuel in real time [inventory location, promotions, and price] in order to maximize the end result, or optimum sales value.

3. THE THREE DIMENSIONS OF PRODUCT OBSOLESCENCE

Our investigations across the Auto-ID Sponsor community and beyond have identified three key dimensions of obsolescence that will help us understand the issues and potential applications better. We will use these three dimensions as a recurring theme throughout this paper, outlining their current causes and effects, and developing Auto-ID based solutions designed to reduce their impact upon revenue and profits:

Dimension 1

Perishability of product: the perishing of items, making them “unsaleable” and thereby causing losses to the manufacturer and retailer associated with mark-downs, write-offs, returns, or destruction of the products. Products are “unsaleable” at the end of their life (the date code shown on packaging) and “unsaleable” at full retail price, within their date code, when the quality of the product has deteriorated. Typically these product categories reside within the grocery or related retail sectors, and would include dairy, produce, meat and pharmacy products.

Dimension 2

Seasonality of product: the relationship between seasonal conditions and the design, look, and usage of items where value is reduced as the season ends, thereby causing product markdowns, or in extreme cases, stock write-offs. Apparel, toys, and gifts are retail sectors most closely identified with the issue of seasonality. Obsolescence in apparel is also closely associated with fashion – where poor design decisions and color choices will cause consumers to shop elsewhere and so drive up product markdowns.

Dimension 3

New product introductions: where the peak demand for items is short, as new upgraded versions, new technology, and new product capabilities, are constantly been developed and introduced to the consumer – often at the same prices as the old products. Consumer electronics and office supplies are examples of retail sectors which typically have to focus significant capability to managing the ‘built in’ obsolescence created by this constant cycle.

All three dimensions may also include the costs of a related supply chain process – that of Returns. Our analysis of the issues driving product obsolescence, and the technology blueprint described later includes a consideration of this “echo” of earlier “pain points.”

3.1. Three Retail Examples

In our first set of business cases around Auto-ID (See White Papers “**Applying Auto-ID to Improve Product Availability at the Retail Shelf**” and “**Applying Auto-ID within the Distribution Center**”) our primary focus was on the consumer goods category and the grocery or supermarket value chain. In considering the issues created by product obsolescence we have looked at other retail sectors, to reflect where they are impacting different industry business models and so give a more rounded vision of how Auto-ID technology can provide benefits and so support operational effectiveness.

The three retail sectors chosen are grocery (**perishability**), apparel (**seasonal**), and consumer electronics (**new product introductions**).

Our research with leading manufacturers and retailers has encompassed many other sectors such as office supplies, home improvement, pharmacy, music and video, and books. Insights from these other categories will be referred to in the development of the paper. Our intent is that this broader scope of product categories reflects the broader participation of other retail sectors in the Auto-ID community.

Table 1:
N.P.I. = New Product Introduction

ISSUE	PERISHABILITY	SEASONALITY	N.P.I.
Primary Retail Sector	Grocery	Apparel	Consumer Electronics
Secondary Retail Sector	<ul style="list-style-type: none"> – Pharmacy – Home Improvement 	<ul style="list-style-type: none"> – Pharmacy – Home Improvement – Office Supplies – Grocery 	<ul style="list-style-type: none"> – Office supplies – Home Improvement – Books/Music/Video

3.2. Product Obsolescence in Grocery, Apparel, and Consumer Electronics

Grocery

Every year the grocery industry comes up with new initiatives to reduce unsaleables, but without the ability to automate the tracking and recording of the product lifecycle, they quickly drop down the priority scale.

It was estimated by the Food Marketing Institute that over \$2bn is lost annually by the US grocery industry on products that are destroyed, returned, placed in salvage or donated to charity.

We will investigate the application of Auto-ID solutions to the “pain points” associated with the dimension of perishability. Given that many grocery categories can be influenced by temperature fluctuations in the supply chain, we will also investigate how the applications of Auto-ID introduced in our first round of

papers can be incrementally adapted to preserve the cold chain and enhance stock rotation policies in order to reduce perishability.

Apparel

It is widely accepted that markdowns can erode over 30% of total recommended retail revenues. Clearly every percentage improvement in markdown effectiveness will have a significant impact on an organization's bottom line.

Markdowns plague retailers selling apparel, with industry averages for markdowns running at over 30%. While a promotions culture is very much a part of the industry, excessive markdowns quickly eat into margins at an alarming rate. Typically merchandise is not sold on a sale or return arrangement, and therefore the only options are to mark down to recover any revenue, dispose through the outlet channel, or donate to charity for tax reasons.

Our analysis will highlight the impact of poor product lifecycle management on the apparel industry and demonstrate how real time inventory data and product location analysis, enabled by an Auto-ID capability, can be put to use to support initiatives to reduce markdown costs.

Consumer Electronics

"80% of our profits come from the first three months of the product lifecycle." In consumer electronics 'maturity' in product lifecycle terms is more about markdowns and returns than peak profitability or operational efficiency.

The consumer electronics industry can be very dynamic and volatile, characterized by small net margins, short life cycles, high inventory turns, aggressive new product introductions, and a frequently used reverse supply chain option, supported by the manufacturer who wants to maximize the impact of his product in the marketplace.

Profitability tends to be focused on the "growth" phase, not the "maturity" phase of the product lifecycle, so meeting release dates and maintaining availability is crucial to success.

We will discuss how Auto-ID can help manufacturers and retailers better manage the product lifecycle, to minimize markdown activity and reduce returns, thereby improving the profitability of the industry.

4. PERISHABILITY: THE GROCERY SECTOR

"No one wants to buy the last product on the shelf."

4.1. Characteristics of the Grocery Sector

Grocers offer a large assortment of products and services, and benefit from some of the industry's highest consumer visits per week and highest inventory turns. For the grocer however, high volumes are achieved at typically low net margins, keeping the business focus very firmly fixed on creating and maintaining highly efficient operations and streamlined order and replenishment processes.

While critical success factors are clearly price competitiveness the having the right store locations, once in the store consumer loyalty is driven by the range and availability of products and the attractiveness of product displays – particularly of perishable products. These are typically located throughout the store to drive consumer interest and help generate a positive impression about the overall quality of the offer.

Any early morning visit to a supermarket is evidence of this – big, bold displays, of produce, meat, bakery, and delicatessen products to entice the consumer and drive impulse sales. In this environment the display guideline can be summed up in the phrase – “no one wants to buy the last product on the shelf.”

4.2. The Challenge – The Pain Points

Pain Point 1

Operational Weaknesses

To keep the offer attractive to an increasingly fickle consumer, grocery retailers are extending the freshness and convenience of their offer, seeking to add new points of differentiation or match those of the competition.

The rise of in-store preparation areas for delicatessen products, fresh fish, bakery, “meals to go”, and hot food centers is a classic example.

All of these add tremendous complexity to store operations, and demand far more from store associates in terms in skill and experience levels. Add to the mix high labor turnover, and the challenge to effective management of perishable products becomes acute.

“When you ask a guy who has never been on the department before to cook enough chickens for the evening’s trade, and tell him to maintain a decent display, then it’s inevitable you get wastage. Experience will teach the individual better practice but given our labor turnover level they may not be there tomorrow.”

The situation is equally serious for other retail formats, which have extended their offer to cover ready packaged perishable categories, such as **drug store chains**, and **mass merchandisers**. For while the overall business exposure to poor perishable management may be less, (with the average transaction value of a pharmacy purchase, for example, being over five times greater than a purchase from any other part of a drug store), the experienced resources and benefit of supermarket volumes are generally missing, resulting in significant date code rotation and the subsequent obsolescence issues.

Operational weaknesses drive product obsolescence across all areas of the supply chain, where manual processes and human monitoring are used to support systemic visibility to product location, quality, condition, and age.

The opportunity for error and inaccuracy is always present in this environment. From the missed pallet of product, which was found too late, to the inaccurate recording of date codes which results in older product being left in distribution centres, to poor product rotation on the retail shelf driving last minute mark downs or unnecessary wastage.

Obsolescence even occurs in the manufacturing process, where the complexity of managing numerous perishable raw materials, and the manual nature of many of the quality control and product rotation activities creates product visibility issues which lead to obsolescence costs.

As one manufacturer put it – “I’d be foolish to say that the manufacturing process, where many different ingredients are handled, rotated, used, and put back into storage, didn’t create obsolescence issues – by the simple fact that it’s hard in this environment to know how much you have at any given time and where it is.”

As product enters the supply chain it is then subject to many manual ‘hand off’ steps between manufacturing plants, distribution centers, distributors and retail stores, where control and visibility can vary significantly, with inventory often left unmonitored throughout these moves either on pallets, cases, or crates. In reality the length of time a perishable product is left on the loading dock, in the store back area, or on the sales floor can vary significantly on a day to day basis and these delays and the impact they have on the product’s condition is currently almost impossible to track. One retailer estimated that 50% of his perishable markdowns and wastage were due to temperature abuse. Nor is it easy to solve, as he put it – “It’s very hard to find out when the abuse occurred and who was responsible.”

The trend towards consolidation of perishable products within the supply chain to drive down distribution costs, for example namely the regional consolidation of produce by third parties, can also create additional product obsolescence issues. For example when several dates are held together by the consolidator before shipping, the receiving DC may easily assume all are at the same date and enter into his systems accordingly. This creates inaccurate data, which is hard to correct until the unsaleable product is discovered during cycle counts or visual checks in cross-dock operations.

Errors in directing the flow of product through the supply chain contribute to obsolescence. Products which are incorrectly located in the warehouse, or ‘mispicks’ where fresher product is picked ahead of older stock, or manual errors on cycle counts where incorrect date information has led to the wrong date codes being entered onto warehouse management systems – all of which are hard to resolve in time to avoid obsolescence costs.

Often the problem is passed on to the store that receives products with less than their desired ‘shelf life’. If the store does not take action in time to move the product quickly to the shelf, or markdown to stimulate sales, then the product can become unsaleable resulting in unnecessary wastage costs.

Pain Point 2

Product Damage – The Issue of “Unsaleables”

Unsaleables are also the squashed bag of chips, leaky detergent bottles and heart-festooned candy boxes still on the shelf two weeks after Valentine’s Day. Customers don’t want to pay full price for them because they’re not what they came to the store to buy: first-quality goods marketed in-season.

A key contributor to the issue of wastage in the grocery industry is the simple fact that we are talking about product that is moved and handled numerous times through different kinds of production processes, transportation modes, storage conditions. Many of these handling activities are carried out to check temperatures, scan product codes, and check code dates – which inevitably adds time into the process and increases the risk of creating unsaleable product for both the manufacturer and the retailer.

Grocery products are supplied through a number of channels to market, with each having different levels of performance when it comes to unsaleable product. According to manufacturers in the GMA study referred to earlier, drug stores rank as the most costly channel in the survey, with an unsaleable rate of 1.83%. Supermarkets ranked second at 1.26%, convenience stores had an unsaleables rate of 0.94%, and mass merchandisers/supercenters had a rate of 0.90%.

Perhaps not surprisingly club stores come in with the lowest figure – 0.24%. Here the channel benefits from stocking fewer and more high-turning SKUs and having lower levels of product handling.

Product handling as a driver of obsolescence is impacted by other physical considerations, such as the quality of packaging materials, the safety of the palletized product (whether product is secure on the pallet or not), and the space constraints imposed by differing loading/unloading bay entrances, sortation units, and internal truck dimensions.

Pain Point 3

The Ordering Issue

One of the most commonly cited pain points cited by grocery manufacturers and retailers was the over ordering of product. One grocer, mindful of feedback from stores who were no longer allowed to control the ordering themselves, said, “The store’s always telling me we are either sending too much or not enough.”

However ordering in the perishable environment is made more challenging by the influence of promotions on sales patterns and inventory levels. Traditionally manufacturers and retailers heavily promote perishable categories, often in reflect seasonal changes in availability or demand, to help drive overall sales volumes. Managing the flow of rapidly changing inventory levels without incurring heavy clearance or wastage losses becomes a key management challenge, requiring substantial resource to monitor daily sales and inventory levels, product date codes, and product quality. To give an example of the impact, one retailer suggested that for bakery products between 40–60% of annual sales may be driven by promotions.

Ironically promotional activity can also have a negative impact on the level of obsolescence in slower moving, non-promoted lines. For one retailer the biggest wastage issue in milk was the half-gallon product which accounted for 75% of all wastage in the dairy category – primarily because the management focus tended to be on the gallon promotion products, making rotation and ordering activities on the smaller sizes typically the last job to be done.

5. CURRENT SOLUTIONS

From a manufacturer’s perspective, it’s about better managing supply with demand – getting the forecast right to prevent aging’ issues, excess inventory, and product write-offs.

Manufacturer investments in integrated planning solutions, improved ERP capability, and more sophisticated and open collaborative forecasting capabilities with both raw materials suppliers and retailers have driven both supply chain efficiencies and a more productive dialogue with value chain partners about how to jointly reduce product obsolescence.

Retailers have tried to mitigate the issue by increasing their requirement on life. During our research, we spoke with several manufacturers who suggested that all retailers now typically took between 70-90% of the product’s life – in the past, non supermarket channels had lower expectations of life which allowed manufacturers to different channels to flex production and so mitigate product obsolescence by not second guessing the order.

From the retailer the attitude is – “we are taking the risk on selling the product so we should have the maximum possible life on the product to mitigate against any potential loss.”

At the store level, operational improvements coupled with moves to further leverage the value of bar codes to support measurement and ordering systems have led to greater visibility of obsolescence losses, and consequently more effective decision making around future production, display or ordering requirements.

Disposing of Unsaleables

Donated: 40%, Salvaged: 30%, Destroyed: 15%, RTV*: 15%

The practice of scanning the bar codes of products marked down or consigned for disposal to facilitate accurate inventory record keeping and support computer aided ordering (CAO) systems is now well established. Most retailers using CAO also now combine the order generation activity with date code

Source: 2002 Unsaleables Benchmarking Study

* Returns to Vendors or Trading Partner.

checks – as each product code is scanned to capture the order quantity, the sales associate checks the dates of the product on display. In this way potential life issues can be identified in advance and action taken to minimize the loss.

However, this practice is very labor intensive and requires consistent management focus to ensure that adequate hours are given over to carry out the process and record all the necessary detail to support both ordering and measurement systems. Frequently, additional attention is required from a more senior level to ensure that loss issues are not being ‘swept under the carpet’.

The FMI study referred to earlier highlighted the lack of common understanding between manufacturers and retailers around the causes of unsaleables and many of the current industry initiatives focus on collaboration opportunities and driving common supply chain best practices in product handling, receiving and dispatch processes and packaging standards.

While many businesses have implemented these best practices and as a result have reported reduced levels of unsaleables, the high labor and ‘process consistency’ cost required to sustain these benefits in the face of competing business priorities has meant that product obsolescence improvements have tended to be short term or localized at best.

5.1. Summary

The lack of end-to-end supply chain visibility to product location, movement, and condition, and a heavy reliance on manual data input and product monitoring are the business norms in the grocery industry.

In effect, the many handoffs and manual recording of information make a step change in reducing product obsolescence costs very difficult to achieve. As one manufacturer put it - “there’s a significant prize for anything that can successfully take some of the labor out that we currently expend on minimizing obsolescence.” New processes and capabilities enabled by Auto-ID solutions would put this prize in the hands of those retailers and manufacturers willing to invest in the technology.

6. POTENTIAL BENEFITS OF AUTO-ID

While we acknowledge that some retailers deliberately prioritize on-shelf availability over the costs of perishable obsolescence, the levels of wastage in the supply chain suggest they could do with striking a much better balance, if armed with the appropriate tools.

As suggested above, the high costs of consistent manual input and monitoring of product obsolescence issues, coupled with ‘visibility gaps’ to the condition and location of products within the supply chain and retail store, make the issue a difficult one for any manufacturer or retailer to address without taking focus or resource away other priorities. Equally important – the lack of visibility and measurement sophistication makes it hard to assess how serious the problem really is.

Deployment of Auto-ID technology, at the case and item level, which supports product control and visibility to condition, can significantly simplify the management of perishable products throughout the supply chain and help reduce the labor traditionally associated with good perishable management practices.

In effect, Auto-ID can provide a new level of measurement and monitoring capability that will drive the creation of more effective supply chain processes. As a result, product obsolescence costs can be lowered, labor can be more effectively deployed and the customer experience improved through fresher product being available.

Specifically, Auto-ID can have an impact on:

- Optimizing FIFO management, by improving data integrity and supply chain visibility with real time data to enable staff to always select the oldest product first, therefore reducing perishable product waste.
- Improving trading partners' visibility of the demand signal and improving supply planning adjustments (the calculation of what product, goes to what locations, and in what quantities). Real time inventory data provides trading partners with an enhanced ability to optimize safety stocks, and more importantly, reduce those occasions where inventory is simply in the wrong place, and expensive expediting to another location is needed to correct the problem.
- Maintenance of temperature conditions – for example, supporting the integrity of the Cold Chain for meats and produce. Our detailed technology blueprint, which follows later in this paper, outlines the integration of Auto-ID technology with temperature control mechanisms that are already well established in the supply chain. The solution will enable recipients to more quickly locate and extract (or amend code-dates of) product that has been adversely affected by temperatures at some point in the supply chain. This product can be more easily identified and appropriate action taken.

Table 2

PAIN POINTS	AUTO-ID APPLICATION		BENEFITS	
OPERATIONAL WEAKNESSES	Pallet	yes	<ul style="list-style-type: none"> - Monitor FIFO compliance - Provide real-time visibility to code-date to improve rotation - Improve detection and resolution cycles - Reduces corporate liability - Improve ability to preserve temperature chain 	
	Case	yes		
	Item	yes		
PRODUCT DAMAGE	Pallet	no		
	Case	yes		<ul style="list-style-type: none"> - Enhanced recording of damage - Automates the audit process
	Item	yes		
ORDERING ISSUES	Pallet	no	<ul style="list-style-type: none"> - Increased visibility to stock 	
	Case	yes	<ul style="list-style-type: none"> - Increased visibility to sales by each location 	
	Item	yes		

6.1. Where could Auto-ID be Deployed First in the Perishable Sector?

Grocery manufacturers and retailers are likely to look first towards high value products which currently require high levels of manual monitoring and control, not just of date code rotation but also temperature and quality issues.

Fresh meat, either pre packed by the manufacturer, or prepared by the retailer, would benefit from the visibility and greater management control provided by item level tagging. The Auto-ID blueprint section describes in detail how the management of meat products could be enhanced by the deployment of Auto-ID technology.

However, given that technology investments, because of the low industry operating margins, are typically made with a long term return on investment in mind, it is anticipated that Auto-ID deployment will be configured to support current technology capability in product tracking, rather than completely replace it.

Another area of early adoption could be Auto-ID applications to support the management of date coded product in the pharmacy category. Product values can be high, but there are also the added legal and regulatory risks of having out of date product on shelf. Drug store chains are also challenged by limited labour availability to monitor the large variety of products on shelf which typically only turnover a few times a year. Auto-ID deployment supporting capability to identify when product is reaching its end of life would therefore provide a number of significant benefits.

7. APPAREL INDUSTRY

“Markdowns now account for a whopping 30% of a retailer’s sales”

7.1. Characteristics of the Apparel Sector

If the defining Product Obsolescence issue for the grocery sector is the **perishability** of the product, then the comparable issue for the apparel sector is related to the **seasonality** of the product.

Demand for apparel, particularly fashion ranges, is highly seasonal in nature. Even basic categories, like socks, underwear and tee shirts, and certain ranges of footwear, slacks, and shirts have some seasonality associated with their selling cycles. For example, having a heavy inventory of shorts in September or winter jackets in February, even when sales have been good, is not a position retailers or manufacturers want to find themselves in.

Both fashion and basic categories are heavily influenced by the prevailing trends in color, cut, and fabric, and manufacturers and retailers pay a heavy price in terms of product obsolescence when they get it wrong. Stock which isn’t moving off the shelves or flowing from the distribution points because of lower than anticipated demand faces one of two fates – to be marked down, or sold off to other businesses that thrive on off-price apparel. Without this action the supply chain becomes ‘blocked’ to the new season’s product, which has already been manufactured and is waiting its turn in front of the consumer.

Getting it wrong for one season results in lower than predicted sales and profitability and potentially a reduction in short term future manufacturing requirements. When the pattern repeats itself the issue becomes a public one, as The Gap found to their cost – with negative press coverage and consumers “voting with their feet” and shopping elsewhere. In these situations product obsolescence becomes an indicator of the fundamental health of the business.

The apparel business therefore faces a difficult balancing act between creating in advance an attractive product offering for the consumer, and providing enough stock in all the right sizes and colors to meet the subsequent demand. Even then, the right amount of product overall to meet demand means little if it’s in the wrong store location, or priced too high, or delivered too late in the season.

Inevitably, given the seasonal nature of apparel, product obsolescence costs will occur at some level, and typically an estimate for this loss is built into the margin expectations for the product. Traditionally industry figures indicate that the impact of markdowns is high – with approximately 30% of sales being

achieved at reduced retail prices. Taking only the revenue of the leading US specialty apparel retailers this equates to an annual loss of over \$3bn dollars. This is without factoring in the carrying costs of excess inventory, or the labor costs of processing this level of markdown activity.

7.2. The Challenge – The Pain Points

Pain Point 1

Product Visibility

It is estimated that over 15% of the items customers come to buy are out of stock. For those retailers who complement pure apparel categories with footwear, the proliferation of sizes for each shoe style generate much higher levels of out of stocks, and additional issues for markdown management – such as the influence of size availability on markdown decisions at the style level.

As one department store retailer put it when highlighting the issues he had within the shoe department – “50% of the time our customers ask for a particular shoe/size combination we have to say we don’t have it, and that’s 50% of our customers who go away dissatisfied.”

One retail participant highlighted the practice of locally controlled inter-store transfers as an example in his business of how inventory visibility could be quickly weakened – with neither the store or the center really having a clear and up to date view of stock levels.

Another retailer who carried out a customer survey on purchasing intentions vs product availability estimated that they lost upwards of \$5,000 a month at each store from having the stock but not having it available for the customer when they wanted it, because of poor visibility to the on hand quantities in the back room, fitting room and returns areas. If you had 1000 stores, that would represent \$60m in lost sales opportunity a year.

Assuming that most product within the store is eventually put on display, it’s reasonable to assume that a significant percentage of this merchandise would be sold at a reduced value.

Pain Point 2

Lifecycle management

Responding successfully to apparel seasonality has traditionally not been an easy issue. While the product’s lifecycle in front of the consumer might be short lived, the lead-time from design and sourcing to presentation to the customer is not. The focus has therefore been on successfully predicting the likely demand for products and managing the whole lifecycle of the product, from introduction into the supply chain to clearance of any residual stock at the end of the season.

Accurate forecasting of demand and supply quantities therefore depends on accurate data capture throughout the supply chain and 100% visibility to location (store, back room, DC, distribution) and demand behavior at different price points. Poor data management or product visibility at any point will entail that the assumptions underpinning the forecasting and allocation of new products are likely to be ‘corrupted’, and so create ‘future’ opportunities for unnecessary obsolescence.

Markdown strategies are increasingly based on ‘science’ (the use of algorithms to predict changes in demand patterns at different price points) or fixed business rules – such as flagging markdown candidates when their weekly sell-through percentages fall below a certain value.

These are driven from an awareness at the ‘global’ level of the inventory position by product and create common changes for all stores irrespective of differing sales levels affecting individual stores. They rely

for effectiveness on consistent implementation across all stores. However visibility can quickly break down if product is missed or changes are not actioned on time. This can result in slower sales than expected and additional losses due to product obsolescence at the end of the season.

Pain Point 3

Supply chain trade offs

Many specialty apparel retailers operate a “closed loop” supply chain where the manufacturer creates own label products that are supplied exclusively to the retailer. Often this control over the end-to-end process creates challenges for the retailer in terms of how much stock to hold where, and in what state (finished verses unfinished goods). If the product is in the Far East when demand takes off then the opportunity could be lost, and conversely if too much product is finished and held close to the stores when demand diminishes then product obsolescence becomes an issue. Often it is not clear where the stock is at any given point in time – it could be awaiting receipt onto warehouse systems, in containers out at sea, or even (at the individual level) left in the store fitting room area.

This results in a trade off between matching supply quantities (to meet estimated demand) with the need for safety stock at various points in the supply chain to act as a buffer against the incompleteness of product visibility.

7.3. Current Solutions

Apparel retailers, particularly those with closed loop supply chains are increasingly reducing lead times to better protect themselves against changes in demand and to more quickly respond to changes in fashion.

They are also collaborating with their manufacturer partners to improve the product development cycle and allow later configuration of the finished product – for example agreeing the fabric and cut, but delaying the final mix of colors until consumer preference becomes clearer.

By flexing lead times to better meet demand cycles, holding product in an unfinished state – and ‘configuring closer to the consumer’, the retailer is able to reduce some of the risk of getting it wrong.

In an economic downturn, a company’s first reaction is to slash costs, often across the board, in an effort to make up for lost revenue. In the current economic slowdown, however, new merchandising applications have emerged which seek to impose a more scientific solution to the problems of increasing profitability and reducing inventory obsolescence. These applications leverage mathematical algorithms and sales databases to optimize retail price points, product allocation and markdown strategies.

“Retailers have been trying to perfect the art of markdowns for ages, but art is now becoming a science with the emergence of new software that takes away the guessing game and uses analytics and mathematical algorithms to determine when, where and how to cut prices. The arrival of these programs is gaining a bigger place in retail with advancing technology, the maturation of the Web and availability of cost-efficient computer power.

Price optimization applications focus on tracking prices and sales information over time, then make recommendations for setting retail prices – both the initial selling price and subsequent prices based on changing margin mix requirements. The application is particularly helpful when the retailer is faced with creating a large number of prices in a short time frame.

Markdown optimization applications help the retailer time markdowns to better match customer behavior based on a number of factors, such as store location and past sales performance. This solution reduces

the need for higher initial mark-ups to cover margin requirements and also tracks price and sales information before recommending optimal pricing and stocking strategies.

However, while these applications may help get the ‘startpoint’ right (the initial selling price and optimum theoretical margin), they still rely on data integrity and high levels of inventory visibility to be truly effective in bringing down the costs of product obsolescence.

This is not to say markdowns will ‘disappear’ with the deployment of new Auto-ID technologies. Retailers and manufacturers will still misjudge fashion trends, with the realization only occurring when the stock is on display or sitting in warehouses waiting to be delivered.

7.4. Auto ID Benefits

Auto-ID represents a new capability to improve visibility to product – particularly at the store level, where our research suggests the store has limited visibility to the detail of the inventory they have in stock. This has a significant ‘knock on’ effect on the quality of the decisions made regarding all aspects of inventory management.

By creating enhanced visibility to product location and movement the initiatives mentioned above can be more effectively executed.

The implementation of an Auto-ID solution at the item level will provide a level of visibility to inventory, both in distribution channels and stores that has never before been accomplished in apparel. By increasing visibility, inventory counts will be more accurate, pricing direction from corporate will be more timely, stores will know the approximate location of items in stores and in turn will be able to manage their labor schedule to make price changes around non-peak times. More emphasis will therefore be placed on improving customer service when it counts.

Apparel retailers gain improved visibility to inventory with the capabilities provided by Auto-ID. At each point throughout the supply chain, product data is stored and made available to users for decision-making. As products pass through the retailer’s warehouse, readers track it continuously with product location information being stored in a central data repository. Tracking may occur at the pallet, case or item level. Tracking continuously not only provides real-time visibility to products as they pass through the warehouse but also may improve the turnaround time for priority promotional products.

First, because of late receipts which often result in late product launches or floor sets, items are left on racks far longer than planned. In an attempt to meet margin goals, the lifecycle strategy is ignored, resulting in late application of markdowns to clear these items before the start of a new launch. This change in strategy is often a reaction to preceding events and results in excess obsolete inventory that creates a drain on margin.

Second, a lack of “pure” visibility to inventory in stores results in poor compliance to the lifecycle strategies and consequently, allows unnecessary markdowns and write-offs to occur.

As retailers execute the product lifecycle strategy, items flagged for promotion, launches or markdowns will become more visible. The increased visibility means that price changes can occur in a timely manner and it ensures that all items will be changed at the same time. Used in conjunction with existing price and markdown tools, Auto-ID will be able to help refine optimization and increase profitability. In addition, it will reduce the amount of time associates spend locating items to execute price changes. The added benefit of this is that more time will be spent providing customer service

In addition, Auto-ID can also drive benefits as pallets or cases move through the retailer warehouse and are tracked to storage shelves, staging, and marshalling areas. The greater accuracy of inventory afforded by better visibility supports more efficient and speedy picking of store allocations, thereby reducing the cycle time for getting new season’s inventory into stores. For example, receiving departments get inundated with both promotional and non-promotional products during seasonal periods such as holidays. A lack of visibility to the location of promotional products in the warehouse often requires additional time and labor to satisfy allocation requests. The obvious impact is that if the product isn’t found and shipped in a timely manner, it becomes obsolete and in turn impacts profitability. With Auto-ID, high levels of visibility to inventory throughout the warehouse help to overcome this challenge.

Also, if cross dock processes are involved where the cases or containers of products from the manufacturer are immediately sorted into store orders, automatic identification of products will result in more timely service to stores and so improve the opportunity to sell products at full price when demand is highest.

Table 3

PAIN POINTS	AUTO-ID APPLICATION		BENEFITS
PRODUCT VISIBILITY	Pallet	yes	– Improves inventory accuracy
	Case	yes	– Improves perpetual inventory process
	Item	yes	– Improves the ability to replenish from back room thereby reducing stock out
LIFECYCLE MANAGEMENT	Pallet	no	– Improves product turn-around
	Case	no	– Reduces backroom inventory before end of promotion
	Item	yes	– Enables better product lifecycle management through increased inventory visibility
SUPPLY CHAIN TRADEOFFS	Pallet	yes	– Creates view to total seasonal ownership across channels
	Case	yes	– Improves response time to promotion events
	Item	yes	– Facilitates reduction in safety stock levels

8. CONSUMER ELECTRONICS INDUSTRY

“We’re an industry with 60-day product life cycles and 90-day warranties.”

8.1. Characteristics of the Consumer Electronics Sector

This third example addresses the creation of product obsolescence through the introduction of replacement products or new alternatives.

The consumer electronics sector is distinguished by its short lead times, high product turns, short product life-cycles, and necessity to maximize profits in the short window of opportunity after product introduction. All this must happen with the sting in the tail that new technology comes in at the same price as the old.

Obsolescence in Motion

“By the time you put in your planning, manufacturing and logistics cycle, then place an order, the product [can be] obsolete.”

This sector is also characterized by product categories where the manufacturers more closely control the supply quantities entering the market, particularly in the product introduction phase. This typically has the effect of restricting initial supply to retailers, who pass the impact onto stores in the form of stock allocations, which may bear little relation to predicted or potential levels of demand. Compare this to the grocery model where replenishment quantities are assumed to be unlimited.

While markdown strategies are part of lifecycle management, unlike apparel the gross margins are small, putting greater pressure on a more successful sell-through at full price. This is reflected in markdowns being typically set at a lower percentage of the selling price – between 10–15% on average across the consumer electronics sector.

In this environment, business pressure is to get a steady stream of new products through the supply chain and onto the shelf as quickly and efficiently as possible.

8.2. The Challenge – the Pain Points

Pain Point 1

The “newest version”

The rate of new product introductions fosters consumer expectations that the “newest version” will arrive soon, and so disenchantment with what is currently on the shelf is at risk – fueled by advance notice in the media of new products and enhancements. Following the next upgrade, residual stock must be marked-down or disposed of through other channels. Manufacturer and retailer margins are clearly at risk in this environment.

Pain Point 2

The risk of unsaleables and the cost of returns

Given this pressurized environment, manufacturers often share some degree of the risk associated with timing new product introductions. They may, for example, establish a returns capability and sales support functions to assist the retailers in selling on the products. Clearly, both sides expose themselves to risk – manufacturers being swamped with products they assumed would be sold; retailers with sales support mechanisms which don’t reflect the actual performance of the product.

In essence the whole process puts pressure on the one point of the supply chain where control is weakest – the store. As one retailer put it “we don’t create complexity – we just assume that the store will figure out the ‘simple’ problems we keep giving them.”

To protect relationships with retailers and maximize the impact of new product introductions, consumer electronics manufacturers will often enter into “sale or return” agreements with the retailers toward the end of a products expected demand curve. The costs associated with the return of unsaleables can be significant.

Rogers and Tibben-Lembke in a study of the consumer electronics industry have analyzed the major problem of returns management in the consumer electronics industry.

They cite the costs of reverse logistics as having the impact to lower profits for the computer and electronics industries by as much as 25%. Further, some categories like CD-ROM and DVD drives have had return rates in the past of 25–40%.

John C. Dvorak,
Our Legacy: Computer Junk, PC
Magazine Online, February 6, 2001

“By 2005, more than 63 million PCs will be retired, according to a recent study by the National Safety Council. An estimated 20 million PCs became obsolete in 1998, and most of these are still in storage were disposed of.”

Pain Point 3

Lack of SKU visibility

Consumer electronics products are typically held by stores in small quantities. Operational errors that result in a lack of visibility to even one item can have a significant impact to lifecycle management at the store level. The error could be because the product arrived early, before its intended display date and so was locked up in the storage area. At this point most businesses would rely on manual processes and management intervention to ensure the product finally reached the shelf. If these failed then the sales opportunity may be lost.

This issue is compounded by the fact that most of this product comes in singles, within totes, and is therefore easily missed. “Once product goes into a tote and leaves our warehouse we tend to lose sight of it...and 80% of our product goes to stores in a break pack fashion.” In other words – basic downstream visibility is a critical issue.

On the other hand – discontinued or ‘supplanted’ product doesn’t have a home to go to, or the clearance space is full, so it gets put back into the backroom store where it “can’t be seen.”

When new product is sent out early to smooth delivery flows, this puts additional pressure on existing space if the store decides to put the product on display rather than hold it in storage. As one retailer put it, “We have nothing (information) at the store level which allows us to effectively understand what new items are around and when they should be on sale.”

While computer manufacturers such as Dell have led the way in the electronics industry in moving to a “make-to-order” manufacturing model which reduces the potential costs of product obsolescence and reverse logistics, this is still not the norm for electronics manufacturers using the traditional retail channels to market. Indeed many electronics product categories remain firmly in the make to stock model, due to the nature of the item (where the bulk of the investment dollars are in the development phase) or the cost-to market structure.

Contrary to academic perception, the problems of obsolete inventory and reverse logistics are so challenging in the consumer electronics industry that companies view the “growth” phase of a product’s lifecycle as the most profitable, and not, as you would assume, the “maturity” phase. Timing out obsolete SKUs is a very costly problem.

Items such as PC peripherals, some hardware components, printer cartridges, software and handheld games and devices must continue to be made, shipped and displayed on shelves to be cost effective.

Finally, the consumer software industry presents an interesting example of challenging inventory practices. Because the cost of a product is low by comparison to the retail price, manufacturers often prefer to “flood” the retailer with product rather than risk going short – especially if the software product is viewed as a potential “hot product” that could have a short peak of demand, a “fad” for example. Because of these practices, Rogers and Tibben-Lembke estimate return rates in the software industry hover around 20%.

8.3. Current Solutions

The fast changing pace of consumer electronics sector's product development is creating a different kind of challenge for inventory managers working for retailers and manufacturers. Inventory managers are not only acutely aware of the challenge presented by excess, obsolete and slow-moving inventory, they know that, if left uncontrolled, it could adversely impact the bottom line.

In a sector where margins typically average between 8% to 10% for high turn items such as hand held games and computer accessories, and even lower for high ticket items such as DVD players, the pressure on manufacturers and retailers alike to 'share' the cost burden of markdowns is intense.

Computer manufacturers have developed rebate programs to encourage retailers to reduce returns. For example, one manufacturer gives retailers a one percent rebate for return rates between four and seven percent, and up to two and a half percent if returns are less than one percent for that particular retailer.

Programs such as this may work at the 'global' level, but given poor inventory visibility it is hard for the retailer in particular to see what happened at the store level (how much more could have been sold, if certain sales dates were met and so forth).

For the retailer they have developed markdown strategies and processes, often supported by system applications which formally review markdown options at fixed periods before the on sale date of a new product. Here the intention is both to minimize the cost to the business of markdowns while ensuring a sell-out situation.

It is therefore imperative that making supply match demand as closely as possible is an important part of the equation for consumer electronics. If this is ignored, the risk of markdowns and write-offs increases, and given the low margin threshold could have a significant impact on profitability.

8.4. Benefits of Auto-ID

The big issues that Auto-ID technology addresses are improving item level visibility, product performance and maximizing location sales. Manufacturers and retailers invest significant labor and administrative expenditure in understanding where their product is and maintaining data integrity, but once the product is in the store, this becomes an ad hoc process. Unlike the grocery department model, the consumer electronics industry cannot afford the luxury of cycle counting – at best they gain a high level perspective on the most vulnerable items (theft issues) and most sales sensitive products. Auto-ID technology drives visibility to the next level.

Auto-ID can also drive major benefits in:

- Reducing the volumes of returns going back to manufacturers
- Optimizing promotions management associated with improved inventory visibility in the channel
- Reducing excessive price markdowns and inventory write-offs associated with product obsolescence at time of new product introductions
- Reduction or elimination of the costs of reverse logistics – the "sale or return" arrangements
- Locating end of lifecycle product

In addition, Auto-ID technology will support after-sales applications such as the writing of warranty and sales information onto the PML, thereby supporting the product in the retailer-consumer relationship.

Realistically, Auto-ID cannot completely solve all the issues – there will always be guaranteed sales agreements, returns, and obsolescence created by new product introduction. However, it will provide increased visibility to inventory as it passes through the supply chain. With increased visibility suppliers and retailers will be able to make better decisions about the timing of new products, the pricing of existing products to create space for new products, the location of products throughout the supply chain and if reverse logistics must be executed, a better understanding of the quantity being returned. Overall, this allows for improved decision-making that ultimately improves product flow, product lifecycle management and profitability.

Consider the benefits that could be accrued to retailers who sell or rent Video Cassettes, DVDs and CD. Often there are only a few copies available for sale or rent, but quite often these items are out of place as customers shop around for the movie or music of their choice. With Auto-ID, items may be tracked, identified and replaced which reduces the appearance of stock-outs. The associate, with the use of a handheld device, could execute a quick search for the customer and quickly locate the item being requested even though it's misplaced.

Table 4

PAIN POINTS	AUTO-ID APPLICATION		BENEFITS
THE NEWEST VERSION	Pallet	yes	<ul style="list-style-type: none"> – Enables better product lifecycle management through increased inventory visibility – Improves efficiency in locating and responding to shelf replenishment from backroom – Improves store receiving and display of promotional items
	Case	yes	
	Item	yes	
RISK OF PRODUCTS COMING BACK	Pallet	no	<ul style="list-style-type: none"> – Increased visibility to returning items – Provides better understanding of magnitude of returns before they happen – Improve effectiveness of promotion by increasing visibility to backroom inventory
	Case	yes	
	Item	yes	
LACK OF SKU VISIBILITY	Pallet	no	<ul style="list-style-type: none"> – Increases inventory visibility across the supply chain – Improves tracking capabilities for better forecasting – Improves the ability to develop better pricing strategies
	Case	yes	
	Item	yes	

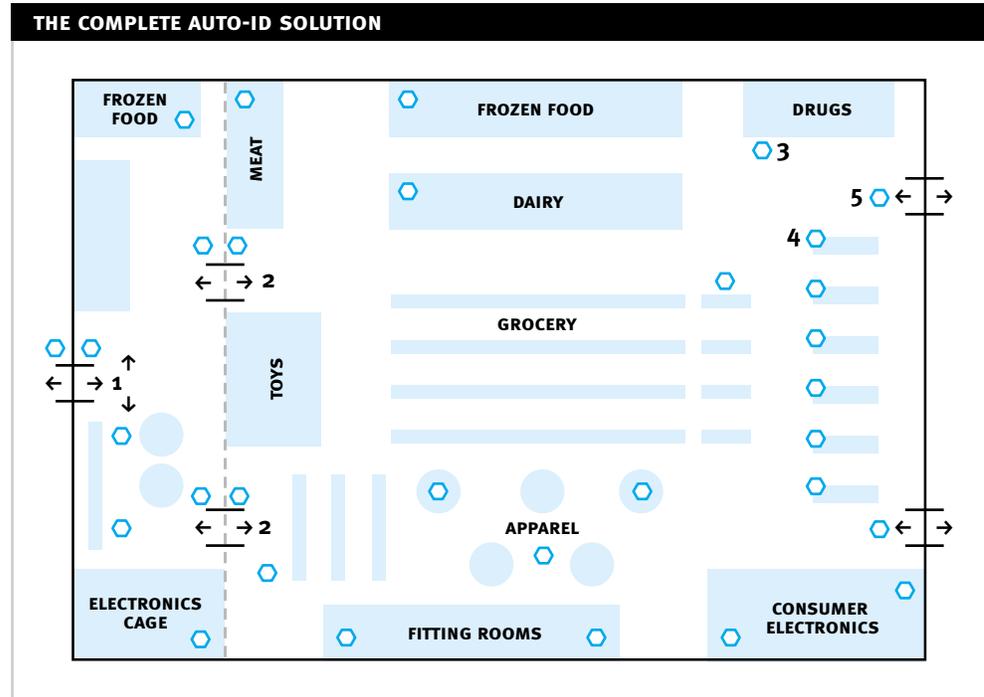
9. TECHNOLOGY BLUEPRINT – THE AUTO-ID ENABLED SUPERCENTER

There are already numerous retail chains that sell products across a large number of categories. For the purposes of the technology blueprint and the business case we have constructed the “Auto-ID supercenter.”

Figure 5 illustrates a complete solution for an Auto-ID enabled supercenter that supports multiple product categories, including grocery, drug, apparel, toys and consumer electronics.

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.



Implementation of Auto-ID for supercenters will present unique challenges and opportunities. As discussed previously in this and other white papers, cost challenges dictate that not all categories of products or all products within each category will be tagged at the same level in the near term. As a result, the ability of supercenters to take advantage of all potential Auto-ID cost savings **will be limited in the short to medium term** as they will have to maintain multiple processes and systems until all products are tagged in the same manner. For example, a supercenter may need to maintain EAS devices for apparel while using Auto-ID tags for consumer electronics products.

On the other hand, there are opportunities for our supercenter to leverage Auto-ID investments across a large array of products. There may be cases when a supercenter can justify item-level tagging when a single category store cannot because elements of the infrastructure were put in place for other product categories. For example, a supercenter may be able to justify replacing their present EAS solution in apparel because the cost of door readers has already been accounted for in a business case for higher-value items.

For purposes of our analysis, we view the supercenter and the Auto-ID solution for supercenters as being comprised of features from the different single-category stores. As such, our analysis of obsolescence will focus on single-category stores with the understanding that solutions for the different product categories can be rolled up to the supercenter.

10. THE GROCERY INDUSTRY

10.1. The Auto-ID Blueprint

Item level tagging of the perishable grocery products clearly has a significant benefit in reducing markdowns and unsaleables. The ability to manage environmental controls based on the product, support date-code recognition, and provide visibility to real-time inventory will help simplify supply chain and store execution processes and reduce resource requirements.

Our analysis shows that, based on the average price of most grocery products, the business case for item level tagging for most of these products will not be attractive for a number of years. Therefore the technology blueprint focuses on the higher value products such as meat that may offer earlier opportunities to tag at item level.

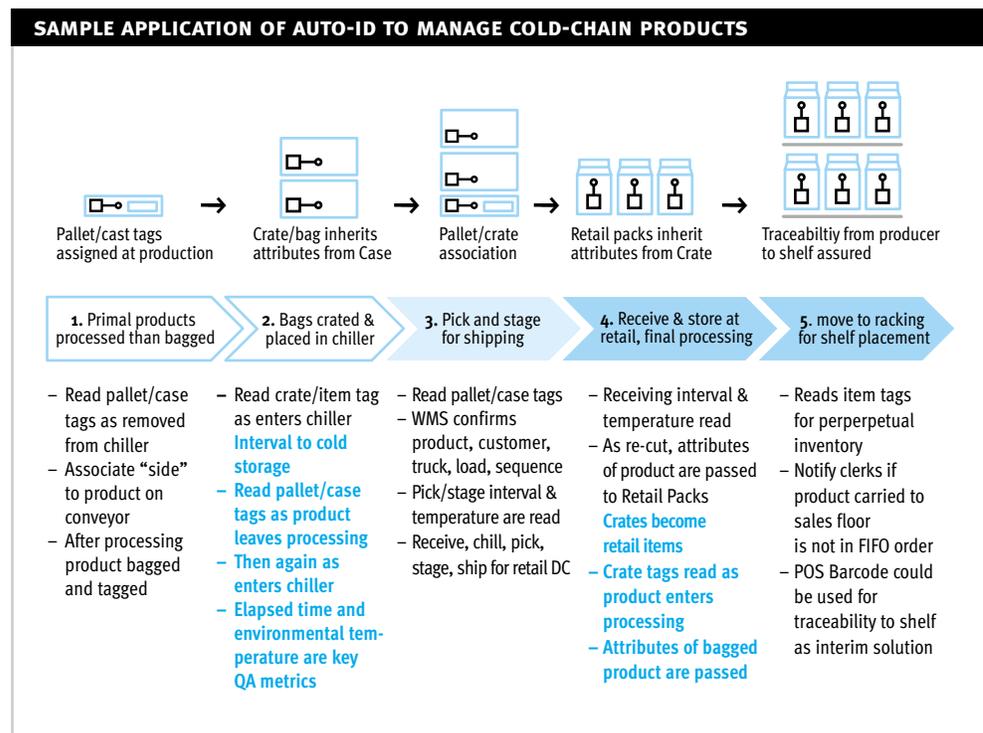
Meat can either come into the store ready for display on the shelf or requiring some further processing and repackaging by the store.

Store prepared products create technology and process challenges associated with preserving the linkage for each individual package back to its original source and original Auto-ID tag as sub-processing activities takes place. While this challenge adds another level of complexity to the overall Auto-ID application, the ability to maintain this level of audit trail for the specific product source will provide the ability to support focused investigations and resolutions when problems with breaches in the cold chain resulting in poor product quality or freshness are discovered.

The example in the Figure 6 illustrates how Auto-ID would track meat, requiring further processing up to the retail coldstore. A linkage between the case and the individual package would have to be created at the end of the sub process activity to ensure an audit trail exists between the original product and the finished goods.

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

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



With Auto-ID tags in place at each of the key hand-off points, the manual audit processes used today to ensure product freshness would be automated. Auto-ID tags applied to the item at the point of manufacture would include the date the product was produced. This would allow readers to establish a “born on” date and capture specific item information throughout the supply chain. Readers would also be able to capture the history of individual items as they make their way from manufacture to the end user. The information gathered by the readers would potentially replace the need for spot checks and audits - both of which are manual, labor intensive activities.

In addition to capturing the code date, readers may also be strategically placed on temperature monitoring devices to automatically capture temperature history. Real time visibility to temperature and code dates will reduce the need for manual intervention in picking and order processing as well as provide valuable data that will enable management to both track and make more informed decisions about unsaleable products.

Figure 7 illustrates how Auto-ID technology can be used in the manufacturer’s and the retailer’s distribution centers to optimize the handling of code-dated product. Using the dates in the system will facilitate the proper timing and movement of products according to FIFO rotation guidelines. Failure to follow FIFO rotation protocol will be noted by a warning device or signal to the distribution employees as well as management, thereby helping to maintain rotation integrity throughout the process.

The preservation of the cold chain could be monitored and tracked back to specific items based on readers linked to environmental controls at each key handoff location. Code dated products could be monitored for expiration and passed to the appropriate levels of management for corrective action when breached. On-hand inventory levels will become more accurate and will provide management with immediate insight to the areas that needs immediate attention.

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...

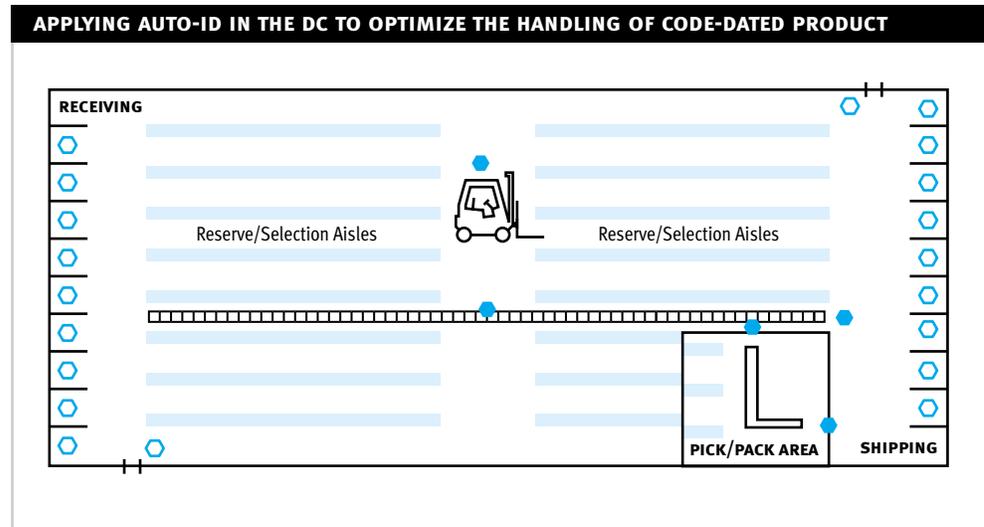
- Reads item and associates tag with product age or promotion characteristics
- Database queries run oldest product first, or alternatively SKU promotional codes that must be cleared first

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



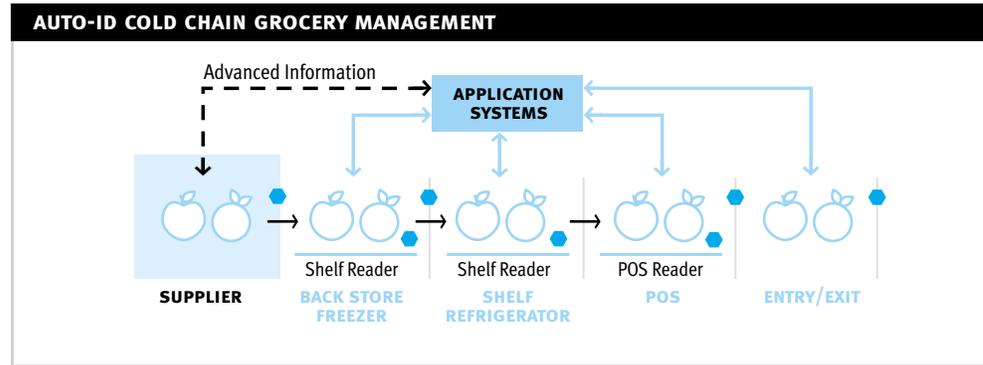
When the product reaches its final destination, the retail display case, Auto-ID applications that support a smart shelf or smart case would provide visibility to facilitate proper rotation of products. This will provide associates with early warnings for products approaching critical code dates or failure to maintain appropriate environmental conditions. Appropriate actions may be taken before spoilage or obsolescence occurs. Products left out of temperature controlled areas would be detected and monitored with the appropriate signals sent to associates to prevent loss. Monitoring items as they leave display cases will help to significantly reduce losses stemming from spoilage.

Auto-ID smart shelf applications will also provide the ability to automate the identification and capture of items that are approaching expiration or have expired. This serves to both protect the consumer as well as to reduce the retailer’s liability for poor product date management.

Figure 8 summarizes the key activities and technology requirements for applying Auto-ID to managing obsolescence at the store for cold-chain grocery products.

Figure 8:

- 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 - Alarms - Application logic: <ul style="list-style-type: none"> - Unsold item triggers alarm

11. THE APPAREL INDUSTRY

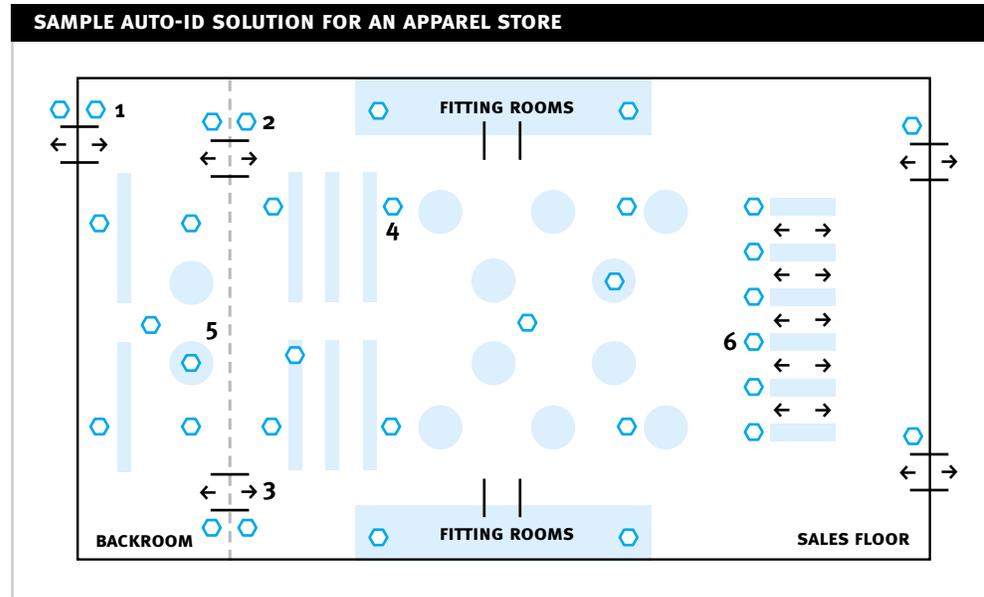
11.1. The Auto-ID Blueprint

As stated earlier the biggest benefit for deployment of Auto-ID technology within the apparel sector will be at the item level.

Given this the Auto-ID functionality requirements for managing obsolescence in an apparel store are very similar to the requirements for a grocery store where item level tagging is deployed, with the exception that readers in apparel do not need to be integrated with environmental controls.

Figure 9:

1. RFID Readers read pallet, case, and item level information through Door 1.
2. Directional information is obtained with the use of two readers on either side of the doors.
3. Readers at doors 2 and 3 can read SKU level information.
4. Readers on the sales floor, in fitting rooms, on apparel racks, and in store backroom are capable of reading SKU level information to quickly locate items that may be out of place.
5. Some racks may be equipped with their own readers.
6. Readers at the check-out counter track when product is sold. POS reader may also deactivate tags.



To use item level tagging to manage obsolescence, read ranges for readers on the sales floor will need to be limited so that items can be tracked to specific locations in order to determine when items are in the wrong place on the sales floor. Limiting read ranges will help store managers to identify situations when the size 8s are in with the size 14s so that the items can be moved back to the correct location instead of to the discount rack.

Readers will be placed on the sales floor shelves or racks to understand what is both on display and on storage shelves in the backroom to track inventory or back-up sizes at store level. In addition, readers in fitting rooms will track inventory of items left by customers to help complete the picture of inventory in the store.

Auto-ID technology can also be applied at the manufacturing level to improve quality in the production process. Improving product quality can reduce obsolescence by increasing the life and durability of the product, and decreasing the percentage of products that are sold through discount channels due to imperfections. One of the industry issues for shoes, for example, is matching the right uppers to the right soles when they are manufactured separately. Tagging the uppers would allow easy association of the two and greatly reduce the potential for 'human error'.

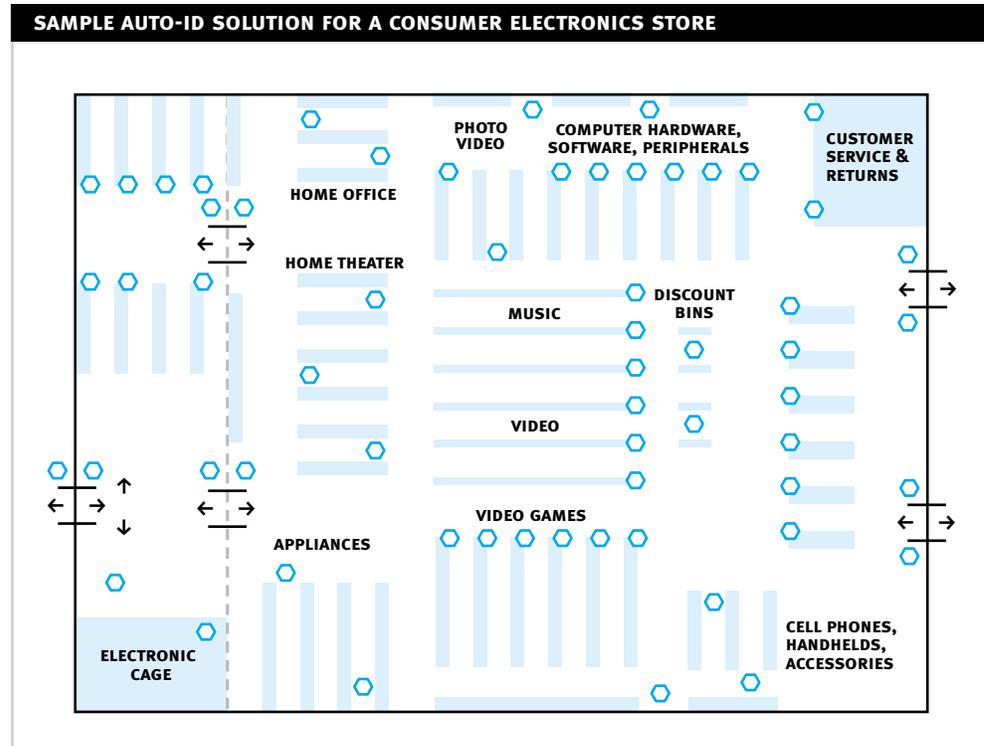
Manufacturer source tagging benefits retailers by removing the labor requirement to tag products at the DC or store level. However, while there are numerous benefits associated with manufacturer source tagging, apparel retailers do not need to wait for manufacturers to source tag products. For example, retailers that carry a large range of branded products should look at applying Auto-ID within the four walls of the business to best control the process.

12. THE CONSUMER ELECTRONICS INDUSTRY

12.1. The Auto-ID Blueprint

Considerations for implementation of Auto-ID for consumer electronics are very similar to those in the apparel industry. The most significant benefits in managing product obsolescence are achieved from tagging at the item level.

Figure 10



Readers will track products at the pallet, case or item level as it moves between and within warehouses and to the stores. At the store level, readers track backroom and floor stock to maintain inventory integrity throughout the system.

Shelf readers in the backroom and on the sales floor will monitor inventory levels for items and provide associates with accurate information. Associates will have information about items that are on the sales floor but possibly misplaced on another shelf. ‘Mobile’ visibility to inventory quantity and location can be enabled by hand held devices linked to the wireless network and so support more customer facing activities.

13. TECHNOLOGY INSIGHT – OBSOLESCENCE

This analysis is a follow-up to the technology insight in the white papers, **Applying Auto-ID to Improve Product Availability at the Retail Shelf** and **Applying Auto-ID within the Distribution Center**. While touching on many of the same technology considerations, the technology insight and cost assumptions in this paper focus on the incremental requirements for obsolescence in an environment where Auto-ID solutions for product availability and the distribution center have been implemented.

Implementing Auto-ID at the DC will require the deployment of a system of readers, an upgrade of the infrastructure, and the implementation of the necessary software applications.

Implementing Auto-ID at the retail store level to track products tagged at the item level will require a more complex network of reader-systems infrastructure to enable reading of individual items on shelves and at display counters. Based on the product category and pain points, there are different approaches that can be taken to integrate readers with application systems. For example, environmentally sensitive

categories such as cold chain products and consumer electronics may require that readers be linked with environmental controls systems. By facilitating the tracking of products out of place, item level tagging coupled with shelf-level reading will improve management of obsolescence and product availability by increasing inventory visibility.

Having POS data based on reading every item as opposed to scanning will help to verify that the items checked are the same as the sold. Having item-level tagging and shelf-readers will provide a check and balance for POS data and greatly improve accuracy of store inventory.

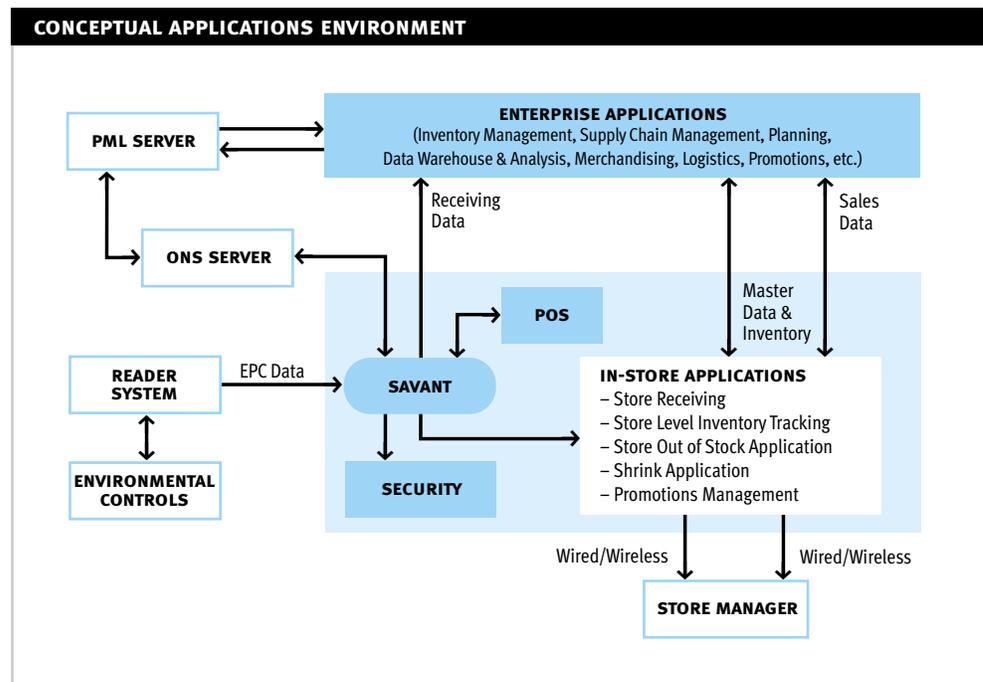
Consideration should be given to integration with inventory management systems to help enforce FIFO disciplines when moving products from the back room to the shelf. Also, linking inventory systems with Plan-O-Grams will help retailers to proactively manage shelf exposure for items approaching obsolescence such as holiday-packaged items, last season's apparel, and the previous versions of video games. Furthermore, linking products to Plan-O-Gram applications will facilitate tracking exceptions when items are out of place so that the items can be found and moved back to their correct location.

True benefits of the Auto-ID environment can be obtained only if there is tight integration between the Savant™ and other applications within the enterprise. Readers will need to be integrated with environmental controls for perishable products. Modifications to existing systems and the development of new in-store applications will have to be made to support store receiving, inventory tracking, out of stock, shrink and obsolescence applications.

From a technology viewpoint, implementing Auto-ID will require retailers to assess their current technology assets and to develop a migration and investment plan to move to the new environment. Each retailer will need to carefully design requirements related to reader systems, assess incremental storage and data mining needs, and enhance existing software applications to pave the way for Auto-ID implementation.

Figure 12:

Key:
 □ New Application Functionality
 ■ Modifying Existing Functionality
 → Interfaces



14. MEETING THE CHALLENGES – IMPLEMENTING EMERGING TECHNOLOGY IN YOUR ORGANIZATION

14.1. The Impact of Auto-ID on the Organization

Integrating Auto-ID technology into an existing operation or value chain to provide solutions to the “pain points” of Product Obsolescence will create significant design and implementation challenges that will have to be overcome if the potential benefits outlined in this paper are to be achieved.

The challenge is daunting enough when established technology solutions are deployed, with prevailing industry wisdom suggesting that 9 out of 10 technology implementations fail due to lack of attention to change management and organizational issues. When the deployment involves emerging technology, any implementation will inevitably face additional and often unknown challenges.

To repeat one of the comments from our interviews – “we don’t know what we don’t know.” This sums up for many manufacturers and retailers the fundamental problem they face when considering the impact of Auto-ID technology on product obsolescence. Current solutions tend to make sense at a macro level but the lack of consistent and measurable information at the local level makes it hard to see how much benefit could be achieved by deploying new capability. Interviewees felt strongly that the benefits were significant but were far less certain as to the size of the benefit, or where its biggest impact would be felt.

As one retailer of perishable products put it – “we have processes in place to record wastage, and we scan the bar code to create as much data integrity as possible, but it’s very hard to see in reality what each store is losing or why they are losing it.” Similarly, the comment from a respondent from a sector well versed in markdown strategies was “it’s very hard to tell how much markdowns are influenced by poor store execution, or even which location is better for us to sell from than another.”

Whatever the benefit of deployment is, there are some clear themes that the organization will have to respond to. In our view, the key challenges are:

Challenge 1: Adapting to a real-time data environment

Challenge 2: Building simplicity into the operation

Challenge 3: Taking advantage of the sales opportunity

Challenge 4: How to move forward

Challenge 1

Adapting to a real-time data environment

Knowing the actual performance of every product will add tremendous capability to both the manufacturer and retailer. The challenge will be how to organize to leverage that capability to transform trading relationships, product and pricing strategies, customer service standards, and supply chain performance metrics including reverse logistics.

As one retailer remarked, “the key thing for us is knowing the location and condition of a product at any given time.” If we know that then we can more easily find the weaknesses in our systems and processes and build applications that help us make better decisions.

Combined with real time visibility of how and when the product is moving through the supply chain and into the customer’s basket, the information available will support new standards of performance for all value chain partners and demand far more of each in terms of process compliance. It will be much clearer whether markdown activity for example is a result of rapidly changing fashions or poor business execution.

New information will also help in determining the appropriate channels to market. For example many retailers (and manufacturers for that matter) either struggle to move from DSD to DC distribution, or vice versa because of a lack of reliable data on the respective values of each and the impact of accommodating current DSD processes into the organization.

Data management, data storage, and clearly defined reporting mechanisms constructed into management dashboards will help organizations adapt to a real-time information environment. Some comfort should be gained from the fact that organizations will improve their data integrity (and reduce their mammoth struggles with inaccuracies in POS data) – and be able to base decisions on dependable data.

Challenge 2

Building simplicity into the operation

One respondent said “everything in retail is about manpower – anything that improves our business capability without asking more of the staff is good news.”

One of the benefits of Auto-ID deployment will be the opportunity to simplify many of the core store processes. Some of the obvious ones have already been highlighted in previous papers, for example automatic receipt of deliveries, stock location and rotation reports and replenishment priority reports. By tying product obsolescence applications to the use of Auto-ID technology, many additional daily routines become simpler – for example product rotation, date code verification, product condition, the recording of wastage and markdowns, and the maintenance of data and inventory accuracy.

Further applications which work with plan-o-grams would assist the introduction of new lines and the sell through of existing products – for example in the consumer electronics sector, where freeing up shelf space for new products is critical to maximizing sales.

Perishable or any other kind of date coded products in the Auto ID environment can be rotated to ensure the oldest products are sold first. Employees can be used more efficiently because they can locate inventory readily when needed to rotate product “FIFO.” This saves many of the hours currently spent looking for inventory to replenish shelves. Alerts created around the visibility to date codes will also simplify the process of rotation and support the capture of wastage.

Essentially, Auto ID systems will provide management with access to a step change in the accuracy and timeliness of information, allowing decision making to be both speeded up and made transparent to the business. At the same time all employees can be empowered through the better quality of information to make the appropriate decisions when processing daily product management issues.

Challenge 3

Taking advantage of the sales opportunity

Clear opportunities exist, especially for the apparel and consumer electronics categories, to support optimal product placement in the store in order to drive sales and reduce future markdowns.

For perishables, a better understanding of what is being reduced or thrown away will enable store employees to act on that insight in a timely way to drive better presentations (in an industry where visual attractiveness is key to sales levels).

These opportunities, though, will need to be clearly communicated to all associates to help them let go of old workarounds and outdated manual systems which only serve to support partial visibility to the pain point. One of the reasons COA has not been fully embraced in the USA is because people

'don't trust the figures' – assuming (often rightly) that the inventory data in the system is not accurate. Now they will have to be convinced that data accuracy has reached a new level and there is no longer a need to check and recheck the numbers.

Challenge 4

How to move forward

While RFID implementations are numerous, they are also predominantly focused in the manufacturing process (for example, bill of material tracking or monitoring of inventory levels) or in applications associated with smart cards. Applications within the consumer goods and retail industries are still rare. Therefore the way forward would be on a 'Proof of Concept' basis where specific benefits and applications were envisioned. However, the focus should not be so narrow as to miss identifying potential unforeseen benefits or new process opportunities. This is a remarkably integrated technology that will have tangible and intangible impacts across almost every aspect of an organization's activities, if implemented to its greatest potential.

That said, a Proof of Concept exercise should incorporate a business case highlighting clear, realistic, and measurable benefits around a particular part of the supply chain under the control of the business involved.

This doesn't exclude other supply chain partners – rather it seeks to prove commercially viable applications within the four walls of the organization that do not require trading partner collaboration as an early step. Information sharing and security provisions will add a complexity to any cross-organization proof of concept, and so only close trading partners should consider such scope.

Of course the Auto-ID investments must align with the capital investments already made by the business. Retailers (in particular) live in a low margin business, and when capital investments are made they are set against a long payback period. Therefore there would be tremendous resistance to replacing them. Instead the Auto-ID investments should support existing investments and build upon current technology infrastructures. For example, perishable monitoring of meat using common coding with the supplier and handhelds to record data should link with the date and temperature reading capabilities of Auto-ID.

Moving from proof of concept to more rigorous pilots with business cases attached (incorporating detailed cost and benefits analysis) should focus on specific groups of products where the issue is most strongly felt and the community of suppliers and transportation businesses is small and already collaborating closely. For some retailers this would involve their own manufacturing businesses.

Pilots have a two-fold benefit in the Auto ID implementation environment. First, the technology can be implemented in a controlled manner to uncover any issues unique to an organization that may require additional process development or solutions. The second benefit of a pilot program is that it allows employees a chance to see the system operate in tandem with legacy systems. Employees can compare and contrast the benefits of both systems and get comfortable with the Auto ID system in a controlled environment. Employees will be trained to use the real-time information that the Auto ID system provides, where the information comes from at each point in the supply chain, and how to use the new information. The Auto ID information can be tracked and compared to information from the current system to give employees a comfort level with the accuracy of Auto ID. Implementing the Auto ID system using the pilot method will ensure a smooth transition to the new environment.

15. THE BENEFITS CASE FOR OBSOLESCENCE

15.1. Approach

The IBM Business Consulting Services White Paper series is not designed to present a holistic view of Auto-ID as a solution for a specific company. It is designed to present a viewpoint that captures the fundamental approaches used by most retail business formats. Benefits and costs are presented at the “system level,” or value-chain level. We conducted our analysis for a generalized consumer products value-chain system across seven different industries – apparel, consumer electronics, grocery, healthy and beauty, music and video, pharmacy and toys (reference the Prelude Section of this paper for the broad characteristics of each industry value chain).

Developing customized strategy, migration path and business case must reflect the specific characteristics of your value chain, products, current performance and capabilities, as well as overall business objectives.

The business case for the application of Auto-ID to reduce product obsolescence for retailers references the volume and value assumptions made for the overall value chain business. These high level “system” assumptions are then augmented by more detailed assumptions covering perishables, seasonality, and new product introductions. The focus will be to demonstrate potential tangible benefits that could be accrued through the implementation of Auto-ID and its impact on revenue or margin recovery.

To quantify the benefits of Auto-ID application on product obsolescence, we examine each of the dimensions outlined in Sections 1 and 2 for each product category. Each dimension was given a relative value (defined by its individual impact on product obsolescence). For each value, the potential positive impact of Auto-ID application was estimated and, again, expressed as a percentage. From this, a total positive impact was generated in terms of improved sales revenue or gross margin dollar recovery.

The business case was developed at both the case and item level to provide insight into the likely adoption path. However, it is worth stating here that the assumptions for perishables, seasonality and new product introductions – markdown losses were estimated at 1%, 25%, 12%, respectively. Given the lack of comprehensive industry data around product obsolescence issues, we have used what we believe were very conservative estimates based on available information and feedback from our interviews.

It should be noted that a conservative approach was also taken in estimating the impact of Auto-ID, and that actual benefits may be significantly higher. Benefits were developed for two areas:

- Sales improvements caused by the reduction of obsolescence in perishables, expressed as an increase in revenue
- Gross margin recovery from the reduction of markdown rates created from timely delivery of new products and seasonality

15.2. Benefits Summary

Shown below in Table 5 are the anticipated benefits from implementing Auto-ID at the case and item levels across the entire value chain.

Table 5: Total Value Chain

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

We've documented the benefits from implementing Auto-ID at item level in the previous business case analysis on Distribution Center and Product Availability. Here we've drawn similar conclusions. Benefits from item level application are significantly greater than those achieved at case level, reflecting the higher effectiveness of item level tagging on the reduction of product obsolescence. This also reflects that the full spectrum of anticipated benefits from implementing Auto-ID cannot be completely realized at the case level; thus we expect to see the greatest benefits realized with item level tagging. In the case of consumer electronics, very limited benefits will be derived from case level tagging, since most products are handled at the item level.

15.3. Costs Summary

The costs of deployment are shown below in Table 6. The costs exclude the cost of the tags, which are absorbed at the first place of use, typically the manufacturer. Furthermore, these costs are incremental to implementation costs covered in our initial white papers (see Product Availability White Paper). In this case, incremental costs cover additional interfaces and new application logic to track obsolescence.

Table 6

INCREMENTAL COST OF DEPLOYMENT IN \$000'S				
COST COMPONENTS	INDIVIDUAL STORE		SYSTEMWIDE	
	Case-reading	Item-reading	Case-reading	Item-reading
TOTAL	\$84	\$108	\$9,684	\$16,108
Cost per store (amortized cost)	\$12	\$20	–	–

15.4. Manufacturer Benefits

Table 7 breaks out the anticipated benefits to the manufacturer for the three industries most affected by obsolescence: grocery, apparel and consumer electronics.

Table 7: Manufacturer Benefits

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

We estimate that \$16.3 million in revenues may be saved in grocery perishables for the manufacturer from implementing Auto-ID. This value reflects the opportunity to recover 5.5% of annual “throw-away” items which, if sold contributes to revenue. A similar argument can be made for the apparel and consumer electronics manufacturers. Balanced timing of new product introduction will present the opportunity to save on markdowns or reduce the need for “fire-sales” by the manufacturer. These savings translate into gross margin recovery and will have a direct impact to profitability, generating an additional \$7 million for each industry according to our model.

15.5. Retail Benefits

Table 8 highlights the anticipated benefits for the retailer from implementing Auto-ID.

Table 8: Retailer Benefits

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

At the retail level, product obsolescence has the greatest impact on the grocery industry due to loss from perishables. Our model identifies the potential benefits of implementing Auto-ID to be \$29 million at the case level, and \$67 million at the item level. Potential benefits for other product categories, however, are still substantial, a combined total of \$17 million at the case level and \$50 million at the item level. For these product categories, new product introduction and seasonality are the primary drivers of obsolescence.

15.6. Other Benefits of Auto-ID

This paper has focused so far on the hard, quantifiable benefits of deploying Auto-ID capability within the retail store. However, what is harder to quantify as we look forward to this new world is the potential impact of a different level of value chain capability on overall business performance. These are traditionally classified under the heading of soft benefits, but in reality, the benefits of Auto-ID are far more transformational in nature.

At one level, the increased accuracy, visibility and integrity of data available will allow the retailer to fundamentally reengineer how the store is organized, redefine labor resource priorities, and set new measures of performance. For example, in terms of product availability, store labor resources could be focused on managing availability, responding to system driven alerts of impending out of stocks, monitoring levels of promotion activity, and reviewing the effectiveness of labor allocation throughout the day. Quantifiable benefits will be driven by this new capability, but bottom line, it is the consumer who will benefit the most by being able to buy the products they want when they want them.

This type of benefit can only help the retailer to build and retain consumer loyalty. Consumers today are growing more promiscuous in their shopping habits, and the proliferation of loyalty cards in any consumer's wallet or purse only serves to illustrate this fact. The shopping experience will influence consumers' preferences when deciding between competing retailers, and that experience can be quickly marred by poor product quality or lack of availability. Reducing obsolescence with Auto-ID technology will significantly reduce grocery retailers' headaches associated with food spoilage and stock rotation and improve the customer's perception of the retail store's quality. Superior product freshness will become a competitive advantage and help to drive sales growth for those retailers who embrace this new capability.

At another level, the benefits of Auto-ID can be deployed "system wide." For example, greater real-time visibility of product movement from manufacturer to retailer can help both parties better understand the root causes of product obsolescence issues. Together, the manufacturer and retailer can jointly design new processes to support improved monitoring of product as it moves through the value chain. The enduring benefits will be more effective and more easily verified service level agreements and new value chain performance measures. Moreover, improved visibility creates a "virtuous circle." As product visibility increases, the ability to hide or disguise issues will be reduced, allowing both retailers and manufacturers to collaborate openly and honestly.

